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Mission

Revista Catarinense da Ciência Contábil is a four-monthly publication by Santa Catarina State Board of Accountancy whose mission is to disseminate the scientific production, in the area of Accounting, of professors, researchers, students and professionals from Brazil and abroad, who are selected according to the quality and contribution to the development and dissemination of knowledge within this field.

The articles published in Revista Catarinense da Ciência Contábil are unpublished and undergo a process of analysis and approval by its Editorial Committee (Editorial Board and Ad Hoc evaluators). The content and quality of the articles are the responsibility of their authors and do not necessarily express the point of view of the Editorial Board.

Editorial

The new challenges of the accounting professional class involve mainly the careful analysis of data, disruption in relation to technological advances and the study of relevant topics of the category. Within this scenario, Brazilian magazine Revista Catarinense da Ciência Contábil (RCCC) once again fulfills its role by promoting, in this edition, reflections and qualified debates on current topics related to the Accounting area.

In the first article, **Evaluation of capital market reactions in Brazil and Australia following the environmental accident of Brazilian mining company Samarco Mineração S.A.**, readers may see that, despite the so-called Bento Rodrigues dam disaster occurred in 2015, survey results show that, in the long term, economic, environmental and social impacts have been rapidly absorbed by the capital market and have not influenced the value of mining sector corporate stocks in Brazil and Australia.

The article **Measurement comparability of investment properties of companies listed on Brazilian Stock Exchange B3: an analysis from the points of view of T and H indexes** verifies the level of measurement comparability after the initial recognition of investment properties (PPI) and shows that 40% of companies have opted for the cost method, 36% by the fair value method and 24% have not disclosed the method used.

Next, the article **Effect of family management on evaluation of company performance: evidence from Brazil** presents a study made up of 34 Brazilian family-owned businesses and 66 nonfamily-owned businesses, revealing differences in accounting performance.

As for the article **Factors of anticipatory socialization: a study with Accounting Sciences students,** it suggests that factors of motivation and environment perception do not have a statistically significant impact on involvement and, consequently, on professional commitment.

Another article in this issue, **IFRS and the likelihood of republication: a study of Brazilian companies listed on Brazilian Stock Exchange B3**, presents a study on the transition and post-transition period of adopting International Financial Reporting Standards (IFRS) in Brazil. The objective was to analyze its effect in republication of financial reports and the issuance of audit opinions with proviso or disapproval.

The article **An analysis of the free-riding effect in a shopping center environment during a promotional period of sales** addresses the term free-riding, which is defined as the effect of acting in which “a member of a group benefits from group membership but does not support a proportional sharing of costs of providing such benefits.” Research has shown that free-riding actually occurs in shopping center environments during the Christmas period in promotional sales campaigns.

By closing this edition, the article **Ratio of profitability and disclosure of environmental contingency provisions and liabilities of companies with high potential for pollution listed in Brazilian Stock Exchange B3** shows that the most profitable companies are not necessarily the ones that most disclose information on environmental contingent provisions and liabilities. Have a good reading!

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CAPITAL MARKET REACTIONS IN BRAZIL AND AUSTRALIA AFTER THE ENVIRONMENTAL ACCIDENT OF SAMARCO MINING COMPANY

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ABSTRACT

This paper analyzes the reaction of the capital market after the environmental accident of the mining company Samarco. Samarco is organized as a joint venture between the Brazilian company Vale and the Anglo-Australian company BHP Billiton. The technique of event study was used to calculate the systematic risk (beta) and to evaluate the variations in the return of the shares of companies of the mining sector of the Brazilian and Australian capital markets. Data for the study were obtained from the BM & FBOVESPA for Brazilian companies and the Australian Securities Exchange (ASX) for Australian businesses, throughout the year 2015. The survey results show that in Brazil, just Vale company showed a decline beta coefficient. In the case of Australian companies there was a decline in systematic risk for companies BHP Billiton, Rio Tinto and NCM. The disruption of the Samarco mining dam Fundão has entered into the role of global environmental disasters. However, the economic, environmental, and social impacts were quickly absorbed by the capital market, and did not affect the value of the shares of mining companies in the sector in Brazil and Australia in the long run.

Keywords: Institutional Theory. Stakeholder Theory. Event Analysis. Mining Sector. Environmental Accidents.

1 INTRODUCTION

On November 5, 2015, the Samarco Mining Company dam Fundão, controlled by the companies Vale S.A. and BHP Billiton Brazil LTDA, broke and caused a leakage of about 60 million of m3 of mud of industrial tailings. This mud reached the rivers of the Rio Doce basin, in the states of Minas Gerais and Espírito Santo, and dewatered in the Atlantic Ocean. The

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environmental accident devastated the district of Bento Rodrigues, located in the municipality of Mariana (MG), and caused the death of 19 people. Espíndola, Campos, Lamounir and Silva (2016) reinforce that the impact of the disaster was not restricted to immediate areas downstream of the bus, but impacted waterways, farmland, economic activities and water supply, affecting the Biodiversity of the Rio Doce State Park. More than 1,469 hectares of land were destroyed and around 1,200 people were homeless.

Fonseca and Fonseca (2016) indicate that the environmental accident of the mining company Samarco resulted in global records in terms of volume and distance traveled from toxic mud. The Rio Doce State Park, the main remnant of the Atlantic Forest in the state of Minas Gerais, was faced with an unanticipated threat in its management plan. The negative impacts on the aquatic environment were extended by 663 km, until they penetrated the coastal waters of the state of Espírito Santo. The population of the region faced difficulties related mainly to the lack of water. Most of the cities affected depended on the supply of the rivers of the Rio Doce basin, which were unsuitable for human and animal consumption.

Paradoxically, Samarco mining company has been recognized in the past 20 years as a leader in environmental responsibility in Brazil. In addition to being the first mining company in the world to have ISO 14001 certification for all stages of production. However, the pressure for increased production, added to the uncertainties about the storage capacity of the waste and an inefficient operational monitoring, led to the disruption of the Fundão dam. Fontes e Lopes (2017) explain that this dam is supervised by the National Department of Mineral Production (DNPM) and was classified as a category of "low risk" and "high potential damage associated".

Magness (2008) warns that the anthropocentric focus excludes companies from their ethical obligations on the natural environment. Companies focus only on issues defined within the scope of their "management jurisdiction.” The expansion of this jurisdiction, in addition to economic and legal issues, requires the inclusion of arbitrary or ideological driving forces, towards a responsible performance. The perspective of legitimacy leads companies to monitor social values and act in order to remain aligned with these values. In this sense, *stakeholders* can act (or not) in the direction of maintaining the "social consciousness" of corporations, which in turn develop (or not) an organizational culture based on ethics.

Abreu, Varvakis and Figueiredo (2004) emphasize that environmental accidents give dynamism to the structure of the industry. The changes happen because companies are subjected to significant events that require answers in the conduct, with reflections on performance and the market structure itself. Accidents impact the cash flows of companies (Blanco, Maquieira, & Lozano, 2009; Klassen & McLaughlin, 1996; Yamaguchi, 2008) and increase environmental and social costs (Deegan, 2002; Patten & Trompeter, 2003; Karpoff, Lott, & Wehrly, 2005). Pargai and Wheeler (1995) report that community pressures and informal sanctions can also aggravate penalties in the face of an environmental accident.

Based on the attributes of "legitimacy", "urgency" and "power" established in the model of boss Mitchell, Agle and Wood (1997), it is observed that none of these attributes is fixed in time, and that environmental accidents confer a dynamic. The environmental accident of the mining company Samarco brings out the "legitimacy" of operational procedures involving the storage of mining waste. Under normal operating conditions, the residents of the district of Bento Rodrigues do not have any "power" to force the mining company Samarco and its controllers (Vale and BHP) to worry about the welfare of the population or with the preservation of the Rio Doce State Park, and to show that there is "urgency" in their demands.

Morgan, Gomes e Perez-Aleman (2016) That the accident of the mining company Samarco may be the result of an institutional failure. In the absence of environmental regulation and efficient supervision, multinational companies operate without adequate environmental monitoring of their productive activities, which jeopardize the safety and health of employees, neighboring communities and the environment. In opposition to *stakeholder* theory, the firm's theory maintains that shareholders and investors are the only *stakeholders* that really matter, and that are affected by the performance of companies over time.

Based on the above, this work is based on the following research question: *The capital market, the mining sector of Brazil and Australia, reacted negatively to the environmental accident of the mining company Samarco?* The research uses "event study" methodology to evaluate the responses of investors in the mining sector in Brazil and Australia. The evaluation of the return of actions and the change in systemic risk (beta), which occurred from the first day after the rupture of the Fundão dam up to the hundredth day, allows to understand the pressures that lead the decision makers of the mining sector to incorporate (or no ethical and environmental issues in their business models.

This study contributes to the literature of corporate social responsibility by showing evidence of the relationship between high financial returns in the mining sector and a low concern with environmental accidents (Kumar, Lamb, & Wokutch, 2002; Klerk & Villieres, 2012). The disruption of the Fundão dam of the mining company Samarco entered the list of global environmental disasters. However, economic, environmental and social impacts seem not to have been sufficient to immediately influence the value of the shares of mining companies in Brazil and Australia.

The article is structured in sections. Next, the effect of the institutional environment on corporate decisions and the impact of environmental accidents on investor behavior are presented. In the methodology section are described the econometric models adopted in the study of events and the results on the value of the shares of mining companies in the Australian Securities Exchange (ASX) and the BM & FBovespa. Finally, the discussions reinforce the importance of the capital market in promoting an efficient response of companies towards the prevention and mitigation of the impacts of environmental accidents.

2 EFFECT OF INSTITUTIONAL ENVIRONMENT IN CORPORATE SOCIALLY RESPONSIBLE DECISION-MAKING

Companies generate contributions to sustainable development through socially responsible action. Corporate Social Responsibility (CSR) is characterized by the identification, anticipation and management of *stakeholder* expectations (Clarkson, 1995). CSR's concept is based on understanding how the institutional environment and governmental policies affect the company and, therefore, reflect the company-society Relations (Siltaoja & Onkila 2013). These relationships can be market-oriented or not. However, institutions are needed to encourage corporations to respond to social concerns beyond their own economic interests (Campbell, 2007).

The institutional framework of each country reflects its history and the peculiarities of its socio-political figuration (Jamali & Mirshak, 2007). However, based on the common thesis of globalization, the Western model of RSC has been introduced in emerging countries. In this sense, a "cosmetic" level of "explicit" CRS can be materialized by means of isomorphic pressures (Jamali & Neville, 2011). Abreu, Cunha and Barlow (2015) demonstrate that developed countries have a clear set of limits and parameters that guide their responses to corporate social responsibility. In contrast, in emerging countries, the boundaries are more blurred, allowing organizations to experience new formulations and sustainability definitions.

Institutional dynamics and organizations are interrelated. However, organizations do not react directly to all pressures dictated by the organizational environment, nor do they act in a completely autonomous manner, without the influence of external pressure (Hoffman, 2001). A variety of institutional conditions influence management decisions to act in a socially responsible manner. Companies are more likely to act responsibly when monitored by strong state regulations, NGOs and other independent organizations or that have collective industrial self-regulation. These *stakeholders* can be engaged in dialogue and create pressure on the companies (Campbell, 2007).

Managerial decisions are therefore strongly influenced by three institutional mechanisms – coercive, mimetic and normative isomorphism – which create and disseminate a common set of values, norms and rules to produce similar practices and structures Between organizations that share the same field (DiMaggio & Powell, 1983). Institutional theory emphasizes, therefore, the role of pressures imposed on institutions, which influence the organizational field in which companies operate (Meyer & Scott, 1992; Milstein, Hart, & York, 2002).

Within the institutional context, there are pressures that can influence the strategic decisions of managers, such as the pressure exerted by governmental agencies, which are realized through legislations, regulations and other coercive mechanisms. Delmas and Toffel (2004) state that the existence of governmental pressure is important because society, in general, is not aware of the environmental impacts generated by productive activities. Henriques and Sadorsky (1996) argue that without proper regulation it would be unlikely that there would be efforts to mitigate such impacts.

Other sources of pressure, pointed out by Delmas and Toffel (2004), are the community and consumers. Communities can also exert coercive pressures on companies through political representation, environmental activism, and NGOs. Community pressure can lead the government to create more incisive mechanisms for protection and regulation. This, in turn, can induce companies that lead the market to adopt a more environmentally proactive posture. The institutional pressure of consumers originates in the competitive environment in which companies operate. The supplier-consumer relationship is the main mechanism through which management attitudes and standards are developed with a focus on the quality of products and services.

In the case of mining companies, Lin, Li and Bu (2015) recommend that, in order to be considered responsible, companies should evaluate the positive and negative impacts resulting from their productive activities. To get the "social license" to operate, mining companies must engage with the community. Jennings and Zandbergen (1995) evidenced the influence of the institutional environment on the adoption of environmental practices, especially after the occurrence of environmental disasters. In this sense, Alpaslan, Green and Mitroff (2009) Confirm that "crisis situations" can affect the dynamics of *stakeholder* management.

2.1 Effect of environmental accidents on the investor behavior

Magness (2008) used the projection model proposed by Mitchell et al. (1997) to investigate the dynamics of decision-making by investors and managers, with respect to two environmental accidents involving mining companies. In the view of Baskerville-Morley (2004), legitimacy and power are attributes that can vary depending on each situation. However, urgency is a "chronological" attribute, that is, it can change from a particular event, fixed as a point in time. Specifically for managers, Magness (2008) found a perception of the "power" attribute, followed by an increase in regulatory requirements.

Magness (2000) It states that the operational risks faced by a company are common in the industry. An environmental accident can intensify regulation on the part of the government, which will affect all companies in the sector. Stricter governmental regulation can impact business cash flow. Magness (2008) observed a significant difference in investor behavior in cases of a second environmental accident involving companies from the same industrial sector. Due to the low knowledge about the operation of the company and its operations, investors see the first accident as a fatality. However, when a second accident occurs, the behavior changes, and investors start to penalize, in general, the companies in the sector.

Jenkins and Yakovleva (2006) recognize that investors are increasingly interested in investigating the social, environmental and ethical dimension of a company before investing in it. In the case of the mining industry, disseminating social and environmental information is crucial to obtaining an image of "responsible company" in front of investors. The analysis of the annual reports represents, therefore, a way of understanding in what degree environmental accidents change operational procedures and the conduct of managers.

Elliott, Wang, Lowe and Kleindorfer (2004) show that the level of attention of companies in the chemical sector to environmental impacts, including those generated by accidents, is associated with the socioeconomic level of the surrounding community. The authors show that the largest chemical companies are located close to communities with a higher level of social inequality. These communities have a low capacity to organize themselves and end up being exposed to high health risks and other environmental effects.

Environmental disasters, such as an oil spill or the disruption of a containment barrage, can influence the investor's perception of the company's future cash flows. This will lead to a movement to buy and sell shares, influencing its price and, consequently, its non-systematic risk (Bansal & Clelland, 2009). Jennings and Zandbergen (1995) Confirm that the accident at the Three Mile Island plant has created a crisis of legitimacy among nuclear power generators in the U.S.

The Fukushima accident in Japan has caused a global impact on the nuclear energy sector. Visschers and Siegrist (2012) suggest that managers should focus on communication with the public, being transparent about the risks that involve nuclear energy and demonstrating its advantages in order to influence public opinion. Goebel, Krekel, Tiefenbach and Ziebarth (2015) evidenced the impact of the nuclear accident on the energy consumption profile of Japanese consumers. Before the accident, there was an average rate of 37% of Japanese consumers who ceased to consume nuclear energy and used energy from renewable sources. In the year of the accident, this rate rose to 74%, and continued at 64% the following year.

Heflin and Wallace (2015) show that after British Petroleum's oil spill, which occurred in 2010, investors began to look for oil and gas companies with better environmental evidence. It was believed that companies would be better prepared for possible changes in environmental regulation, and also for presenting a lower risk of accidents. As a result of BP's accident, there was an increase in the dissemination of environmental information, in particular information about the plans for responses to environmental accidents.

The level of market concentration is also an important element in the dissemination of environmental practices. If a market is dominated by a few actors, there are fewer incentives to engage in socially responsible actions. Patten (1992) evaluated the responses of U.S. petrochemical Companies after the oil spill caused by the Exxon Valdez ship in Alaska. The environmental disclosure of companies in the petrochemical sector increased significantly after the accident. The diversity of large companies in the oil and gas sector influenced the level of disclosure. In the occurrence of extreme situations, other *stakeholders* gain importance, that is, maximizing the value of shareholders is no longer the only goal of CEOs. This effect is strongly observed in more integrated economic environments.

Garcia, Ribeiro, Oliveira Roque, Ochoa-Quintero and Laurance (2017) calculate that the environmental and social damage resulting from the accident of Fundão dam, starring by the mining company Samarco, are of US $521 million per year. The estimated annual loss is around six times greater than all seven fines imposed by the Brazilian government. Other fines are still being discussed, and include different economic, environmental and social compensations. Based on the above, it is possible to establish the first hypothesis of this study:

Hypothesis 1: *The environmental accident of the mining company Samarco negatively impacted the return of the shares of mining companies in the Brazilian and Australian markets.*

2.2 Effect of environmental accidents on the systematic risk of the capital market

Risk is an important element in strategic management and a determinant factor in the performance of companies. Kothari, Li and Short (2009) argue that when the analysis of the content of the reports indicates unfavorable evidence, the company's risk (e.g., measured by the cost of capital, volatility of the return of shares and beta coefficient) grows significantly.

Zreik and Louhichi (2017) Explain that there are three conceptions of risk: total, systematic and non-systematic. The total risk is the sum of systematic and non-systematic risks. The systematic risk, which reflects the return of the company's response to market movements, is represented by the beta coefficient and affects the market more broadly, with economic recessions, changes in the interest rate or increase in inflation (Brigham & Houston, 1999). Klassen and McLaughlin (1996) and Magness (2000) observed changes in the beta coefficient using the technique of "event studies". A decline in the beta coefficient was observed when new information reaches the market.

According to Magness (2008), the decline in the beta coefficient is partially related to a misfit between the company's actions and the market. Investors interpret new information from a meaningful event and take it out on the price of the share. In addition, the communication of high-risk companies on their own risk is positively associated with total and systematic risk. On the other hand, for low-risk firms, communication decreases the three types of risk.

The non-systematic risk reflects the volatility of the return of the company's shares and cannot be explained by the market movements. It reflects the price variability of a company's shares and is associated with events directly linked to it. A lower non-systematic risk is associated with the environmental issue in terms of meeting *stakeholder* expectations. Therefore, we should reduce externalities and increase the evidence of environmental practices (Suchman, 1995).

Bansal and Clelland (2009) explain that the non-systematic risk, which is affected by investor behavior, is related to the environmental legitimacy of the company, which can be explained from the perspective of institutional theory. The authors argue that the environmental legitimacy of a company is seen differently by all its *stakeholders*, each considering its specificity and connection with the company. As an example, they explain that the contamination of a water source generates a health-related concern in the neighboring community, while a shareholder's concern is a fine that can be applied to the company.

The non-systematic risk is associated with a single company or sector, and can be mitigated through portfolio diversification, that is, investment in companies with different activities. However, Bonami and Lejeune (2009) show that, in practice, achieving this diversification is a difficult task due to factors such as: limited number of sectors of the economy, little profitability arising from small holdings in companies and difficulties in acquisition of shares.

In this sense, Aaker and Jacobson (1987) point out that, due to this difficulty, investors in general prefer actions with low non-systematic risk, reducing the need for diversification. This context, environmental information gains great relevance for investors, since the costs generated in the interaction with the environment are, in general, specific to each company, and there is a great difficulty in anticipating environmental events with negative impact (Bansal & Clelland, 2009).

For example, the communication of systematic risk during the 2008 financial crisis increased the non-systematic risk and total risk (Zreik & Louhichi, 2017). Most investors are at risk and interpret the risk communication of a "high-risk company" as an additional risk. On the other hand, low-risk companies, when they disclose their risks, are considered transparent. Lokuwaduge and Heenetigala (2017) reveal that reports can create negative *stakeholder* reactions. Strategically, it seems important to create a positive expectation in *stakeholders* to manage them (or manipulate them) to obtain their approval or distract their disapproval. Based on the above, it is possible to establish the second hypothesis of this study:

Hypothesis 2: *The systematic risk (beta coefficient) decreased after the environmental accident of the mining company Samarco, for companies and the Brazilian and Australian markets.*

3 METHODOLOGY

3.1 Selection of mining companies in the Brazilian and Australian market

A sampling of the Australian and Brazilian mining industries was conducted based on two criteria: industries with the same classification of activity (exploration, development and production of minerals) and that have shares listed in the BM & FBovespa (e.g., Brazilian companies) and Australian Securities Exchange (ASX) (e.g., Australian companies). In the case of the Brazilian market, all companies in the mining sector were selected, totalizing four companies. The Brazilian market is incipient, with Vale as its leader, and the other companies operating as co-adjuvants.

On the other hand, the Australian market is more crowded, and the disparity in the number of companies in relation to Brazil demanded the definition of a criteria for sample selection. A minimum market value of A$600mi was fixed, with the aim of working with companies of similar sizes, which led to the total of eight Australian companies. The effects of stock price change become more evident in this group, containing the largest Australian companies in market value.

3.2 Event Study

The response to the stock price is examined using the "event study" methodology. Campbell, Lo and Mackinlay (1996) define a study events such as the method by which it is possible to measure the effect of an economic event in the value of a given company. This method evaluates the rationality of the market, considering that the effect of an event will be reflected immediately in the prices of the assets.

Curran and Moran (2007) Explain that event studies are used in accounting and finance research to assess the impact on the firm's value in the event of changes in environmental regulation or due to a legal process that may cause damage to the firm. According to Binder (1998), the event study has been used for two main reasons: 1) to test the null hypothesis that the market efficiently incorporates information; and 2) to examine the impact of a particular event on the wealth of shareholders of a given company, based on the "efficient market hypothesis".

The study events assume that an environmental accident that directly affected only a single company will trigger a transfer of information to the entire industry. This transfer is felt in the capital market, with the oscillation of the stock price (Clinch & Sinclair, 1987). Indrabudiman (2017) explains that the reactions in the stock price can be measured by means of abnormal returns, which consist of the variation in the prices of the assets after the event (e.g., environmental accidents, mergers and acquisitions).

Magness (2008) states that event studies are rare. This is partly due to the statistical problems associated with small samples and the influence of the market dynamics itself. Moreover, it is based on the hypothesis that investors will discount "their fear of a legal reaction" in the price of the action. A legal reaction could mean a suspension of the right to operate. Companies in the affected industrial sector could face an increase in information demand, generating an increase in the costs of disclosure.

3.3 Calculation of expected returns

Following the methodology proposed by Magness (2006), to calculate the returns of actions "without the effect of the accident" it is essential to choose a time window. A gap was chosen "200 days before the accident" and "200 days after the accident". The day of the environmental accident of the mining company Samarco (5/11/2015) was fixed with Day 0. The daily returns of the company’s portfolio are regressed in relation to the market return, based on the following econometric model:

$$R_{i,t} = \beta_0 + \beta_1 \times RM_{p,t} + \varepsilon_{i,t}$$

Where $R_{i,t}$ it is the return of the company I and T is the daily variation of the price of the company's share in time t, expressed in percentage; β_0 it is the intercept; β_1 it represents the systematic risk; RM is the return of the market, T is the daily variation in the market and $\varepsilon_{i,t}$it is the end of the referred error of the model. For the Australian market, the return of the S&P/ASX 300 was used, and the return of the Ibovespa was adopted for the Brazilian market. The objective of this analysis is to calculate the values of returns without the effect of the accident.

To evaluate the "effect of the accident", the window of calculation of abnormal returns was reduced to 100 days. Starting from "Day 1", which is the first commercial day after the environmental accident of the mining company Samarco, until "Day 100", separating strata of 10 days in 10. In this gap of 100 days are compared the differences of averages of "returns without the effect of the accident" and the "real returns", using the T test of equality of averages. This analysis identifies whether there was the effect of contagion of the accident in Brazilian and Australian mining.

Portfolio returns are used instead of the company's individual return, because the portfolio-based model has greater explanatory power (Blacconiere & Patten, 1994, p. 367). However, to include in the portfolio the companies directly affected by the accident can influence the results. This is because direct financial repercussions (e.g. environmental costs, costs of repairing damages and litigation) can impact the price of the company's shares. For this reason, the analysis of the return of the portfolio was made with and without the companies Vale and BHP, responsible for the environmental accident of the mining company Samarco.

To measure the value of the companies after the accident, was added the variable Dummy D, which assumes a value of 0 for the days before the date of the accident, and 1 on the day of the accident and ahead. This variable allows you to capture the part of the total return that is attributed to a change of the beta at the time of the accident, as follows:

$$R_{i,t} = \beta_0 + \beta_1 \times RM_{p,t} + \beta_2 \times RM_{p,t} \times D_t + \varepsilon_{i,t}$$

The gap used to calculate the loss of market value due to the accident was "200 days before the accident" and "200 days after the accident". If it is correct to assume that after the accident the shareholders reassessed the importance of environmental management in the risk/return trade-off, the coefficient β_2 will be significant and less than the β_1 coefficient.

4 RESULTS

Table 1 shows the comparison between the "returns without the effect of the accident" and the "real returns" in the window of 100 days after the accident, for the Brazilian and Australian portfolios with and without the companies responsible for the accident. Statistically significant values reveal an abnormal behavior arising from the environmental accident of the mining company Samarco. The significance values allow evaluating behaviors of the type "up and down" of the actions. It can be observed that, for the Brazilian portfolio, including Vale, there is a significant difference in the returns between the model "without the effect of the accident" and the "real behavior of actions" for the days 11 to 20, and 51 to 60. This result indicates an effect on the actions of the mining market arising from the disclosure of the environmental accident of the Samarco mining company. Only for Vale company there was a significant difference in the first 10 days, and in the days 51-60 and 61-70. When the portfolio of Brazilian companies is analyzed without Vale, the econometric model loses reliability. This happens from the fact that Vale is the only mining company with shares traded daily at BM & FBovespa.

Table 1
Significance level of Wilcoxon test between the expected and observed the actions immediately after Day 1 and up to 100 days of the accident

Period (days)	Portfolio Brazil			Portfolio Australia		
	With Vale	Only Vale	Without Vale	With BHP	Only BHP	Without BHP
1-10	0.3049	*0.0658*	0.0526	0.1598	0.1525	0.2099
11-20	*0.0371***	0.4744	0.0253**	0.2727	0.7596	0.4723
21-30	0.4260	0.2610	0.2716	0.3832	0.2610	0.4260
31-40	0.9095	0.1840	0.9698	0.3432	*0.0079****	0.3060
41-50	0.1826	0.9183	0.1588	0.9698	0.1525	0.9698
51-60	*0.0800*	*0.0048*****	*0.0058*****	*0.0477***	0.4039	*0.0477***
61-70	0.1209	*0.0829*	0.0638	0.7335	*0.0248***	0.5202
71-80	*0.0735*	0.1823	0.0435**	0.9090	0.6080	0.9090
81-90	0.3432	0.6094	0.2399	0.1846	0.7592	0.1201
91-100	0.2342	0.3526	0.0420**	0.6200	0.2201	0.7330

Note. *p<0,10; **p<0,05; ***p<0,01
Source: Survey data collected in Australian Securities Exchange (ASX) and BM & FBovespa.

For the Australian market, the portfolio with BHP shows that the difference in the return of shares without the accident and the value of shares is significant for the days 51 to 60. This indicates a late effect affecting the actions of the Australian mining market, originating from the disclosure of the accident of the Samarco miner. Analyzing only BHP, it is observed that the company's actions were affected before (e.g., between 31 and 40 days) and then (e.g., between days 61 to 70) of the effect observed in the Australian market. By removing BHP from the Australian portfolio, the differences show significance in the same period, that is, between days

51 to 60. This result confirms the greater diversification of the Australian stock market in the mining sector. The effect on the actions of a single company cannot affect the market, because there are others with the same volume of negotiations. Therefore, in relation to hypothesis 1, the accident caused a negative impact between the days 11 and 20 for the Brazilian mining market. For the Australian market, the first effect was felt between the days 51 and 60.

Table 2 shows whether there was a change in non-systematic (beta) risk after the accident for the Brazilian market. The portfolio returns are regressed in two moments using the dummy variable, D. The magnitude and significance of the β1 and β2 betas for each company in both markets, as well as for the markets including or excluding Vale, are observed.

Table 2

Comparison of the impact on business in the Brazilian market of 200 days before and 200 days after the environmental accident Samarco mining

Companies in Brazil	β_1	Sig	β_2	Sig	Test F	R²
Vale	*1.098*	0.000	*0.663*	0.006	59.440	0.308
Bradespar	*0.606*	0.000	*1.261*	0.000	64.050	0.325
CCX	0.439	0.066	0.301	0.320	1.351	0.010
MMX	0.444	0.656	0.551	0.663	0.475	0.004
Portfolio without Vale	0.203	*0.561*	0.337	*0.447*	1.788	0.013
Portfolio with Vale	0.427	*0.118*	0.419	*0.227*	6.403	0.046

Source: Survey data collected at BM & FBovespa.

The portfolio of mining companies in Brazil, including or not the main company of this market (Vale) did not show significance, which indicates that the accident did not impact the Brazilian mining market. It can be observed that the magnitude of the beta coefficient before (β_1) and after the accident (β_2) fell to the company Vale, as expected, reinforcing the results found in Table 1. However, for the company Bradespar there was an upward behavior, and for the CCX and MMX companies there was a little significant change.

Table 3 shows the comparison of the impact of the environmental accident of the mining company Samarco in the Australian market. The β_1 coefficient is significant, and the magnitude of the betas coefficients fell to all companies. However, only for BHP, Rio Tinto and NCM companies the β_2 values remain significant. This result indicates that the effects of the environmental accident of the mining company Samarco reduced the value of the shares of these companies. Analyzing the Australian portfolio with and without BHP, it can be observed that the β_2 coefficient is only significant in the portfolio with BHP, observing a reduction of 1.073 in the value of β_1 to 0.277 in the value of β_2. This result confirms the diversity of the Australian stock market in the mining sector, which has several investment options.

Table 3

Comparison of the impact on business in the Australian market of 200 days before and 200 days after the environmental accident Samarco mining

Companies in Australia	β_1	Sig	β_2	Sig	Test F	R²
BHP	1.225	0.000	0.731	*0.000*	124.000	0.482
AWC	1.074	0.000	0.331	0.102	50.850	0.276
Rio Tinto	1.059	0.000	0.489	*0.001*	108.800	0.449
FMG	1.485	0.000	0.473	0.214	27.290	0.170
NCM	0.622	0.000	0.523	*0.036*	5.771	0.042
BSL	1.277	0.000	0.066	0.812	27.740	0.172
SGM	0.670	0.029	0.493	0.292	5.125	0.038
ILU	1.177	0.000	0.287	0.190	48.920	0.268
Portfolio without BHP	1.052	0.000	*0.212*	0.175	73.870	0.394
Portfolio with BHP	1.073	0.000	*0.277*	0.067	86.720	0.390

Source: Survey data collected in Australian Securities Exchange (ASX).

The confirmation of hypothesis 2 for companies and the Australian market is observed. There was a decline in systemic beta risk for BHP, Rio Tinto and NCM companies, and for the portfolio with BHP. In the case of Brazil, hypothesis 2 was confirmed for Vale and rejected for the Brazilian market as a whole.

5 DISCUSSION

The study adopted the methodology of "event study" to evaluate the responses of the capital market to the environmental accident of the mining company Samarco. The variations in the return of actions and the systematic risk (beta) of the controlling companies BHP and Vale were evaluated and the markets in which they operate. The results allow evaluating the dynamics of the institutional environment and the effects of the environmental accident of the mining company Samarco in the behavior of shareholders and investors in the mining sectors in Brazil and Australia.

Using the model that presents the market parameters for the return of the shares of the Brazilian and Australian mining companies, it was observed that, in the first days after the accident, Vale's actions suffer losses, and soon after the Brazilian market as a Whole is affected. The disclosure of causes, effects and responsible people generated a change in the actions of Vale and the Brazilian market. But after 60 days of the accident the effect of "climbs and descends" of actions is no more sense.

For the Australian market (without and with BHP), the effect is significant only from days 51 to 60. The actions of BHP were subsequently affected by the Brazilian parent company. Vale and BHP companies were not associated with the operation of the Samarco mining company. Corroborating this result, studies by Laplante and Lanoie (1994) in Canada state that stock prices do not respond immediately when a company is cited for an environmental infringement or when a regulatory action is incited. The significant effect occurs only when a lawsuit results in a fine.

The systematic Risk analysis (Beta) demonstrates that the market and the companies in Brazil, except for Vale, did not present significant results. Klassen and McLaughlin (1996) studied the beta coefficient in front of several events. Magness (2008) Concluded that the decline in the beta coefficient is related to a misfit in the price of shares while investors are assimilating the event, its intercurrences and the effects generated.

The results for companies in the Australian market showed a decline in systematic beta risk only for companies BHP, Rio Tinto and NCM. The Australian market seems to have felt more the effects of the environmental accident of the mining company Samarco due to its competitiveness and volatility characteristics. These results are consistent with the findings of Lokuwaduge and Heenetigala (2017), in which Australian mining companies perceive stakeholder pressures to report on environmental, operational security and corporate governance information. In line with the theory of legitimacy and stakeholder theory, companies in the metals and mining industry in Australia disclose this information in a way that reduces regulatory risk and safeguards its legitimacy.

The Brazilian mining market has a low competitiveness and limited investment options. According to the international consultancy SNL, in 2014, of US $11.4 billion invested by private initiative in non-ferrous mineral research projects, only 3% were carried to Brazil. While other countries received greater investment potential, such as Chile (7%), Peru (5%), Mexico (7%), USA (7%), Australia (12%) and Canada (14%)(TRENDS, 2015). In Brazil, it is still observed the presence of Vale company, operating in almost the entire market, and the company Bradespar, as the second largest company in the mining market, which also invests in Vale. Two other companies (CCX and MMX) behave in an incipient way in the mining market.

The study of the events along a "200-day gap" allows evaluating the influence of the institutional environment on the behavior of the decision makers of the mining company Samarco and its controllers. Evaluating the regulatory pressures, Fonseca and Fonseca (2016) warn that the legal-normative environmental framework of Brazil has been fragile and in danger of acting summarily in defense of corporate interests. One of the pillars of environmental legislation, which lies in the precautionary principle, in which the State should adopt measures to avoid significant environmental damage, seems to be neglected. The dysfunctional division of power between the companies involved and their *stakeholders* becomes evident in the lack of control of the actions of the Public Ministry and Judicial Power.

Weak normative and mimetic pressures confirm the delay in the response of the stock market. This result signals that weak corporate social responsibility models are accepted in the mining sector. The results of this research seem to indicate that the performance of the mining company Samarco was limited to the scope of its "management jurisdiction", which translates the gaps in the institutional environment. It is also observed the absence of the attributes of the *stakeholders*, defined by Mitchell et al. (1997). Ethical/social and/or environmental investments would only have been made if the stock market sent clear signals to companies in the mining sector. The decisions of the mining company Samarco seem to have been guided by a weak code of corporate governance, which excludes *stakeholder* demands and focuses on maximizing return to shareholders and investors.

A relevant issue to explain this "delay" in the mining sector response involves an assessment of how the media dealt with the environmental disaster caused by the Samarco mining company. Fontes e Lopes (2017) highlight that the media, at first, did not approach in depth the issues related to environmental impacts (e.g., mud toxicity, water supply and impacts on the biological diversity of the affected region). This behavior can be explained by the lack of knowledge, or even intentional, due to the interests of the companies controlling the mining company Samarco.

However, the sensationalist approach was present, and always minimizing the responsibilities of Samarco, Vale and BHP companies and their possible consequences. Thus, the media transmits the information to society but without presenting the existing relationships between mining activity, environmental damage and social issues. Garcia et al. (2017) warns that the looting of certain Brazilian laws and the granting of new exploration areas are being carried out without a clear dialogue with society.

6 CONCLUSIONS

The event study revealed that there was an immediate negative impact shortly after the accident only for Vale's actions. The Brazilian market felt this effect after 10 days, and the Australian market after 50. Only with the disclosure of the details of the accident is that it could be seen a late and temporary effect on the actions of the controlling companies and their markets. However, the economic, environmental and social impacts were quickly absorbed by the capital market in Brazil and Australia, and did not influence the value of the shares of long-term mining companies.

Regarding the hypothesis of systematic risk (beta), the research findings reveal that there was a decline in the coefficient for the companies Vale, BHP, Rio Tinto and NCM. The findings of the research confirm the argument that in more competitive markets there is a tendency to seek legitimacy. As they argue Pellegrino and Lodhia (2012), there is a social contract between organizations and society based on implicit and explicit expectations that society has on conducting business operations.

It should be recognized as a limiting factor of this research the restricted number of companies and the very particular situation of the Brazilian mining market, with only one leading company (Vale), one investor (Bradespar) and two companies (MMX and CCX) with incipient operations In the mining market. Another limitation involves the amount of explanatory variables in the econometric model for calculating the return of shares. Despite the limitations, the work warns of the need to broaden the pressures of investors on the mining sector. This pressure should ensure that mining companies act responsibly, and that the traumas of this disaster do not protrude or repeat themselves.

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COMPARABILITY OF THE MEASUREMENT OF INVESTMENTS PROPERTIES OF PUBLIC THE OPEN COMPANIES LISTED ON B3: AN ANALYSIS UNDER THE OPTICS OF T AND H

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ABSTRACT

The international standards symbolized the beginning of the harmonization of accounting standards, which includes, among other qualitative characteristics, the comparability of accounting information. The CPC 28 (2009) allows for accounting choices between the cost and fair value method in the measurement of Investment Property (PPI). The general objective of this article is to verify the level of comparability of the measurement after the initial recognition of the PPI of the public companies listed on B3. The sample consisted of the 91 companies that presented PPI balance in 2015. The data were collected in the Financial Statements and in the Explanatory Notes. To verify the level of comparability, the H index introduced by Van der Tas (1988) and the T index proposed by Taplin (2004) were used. The results showed that 40% of the companies opted for the cost method, 36% through the fair value method and 24% didn't disclose the method used. Additionally, it was observed that 58% of the companies using the cost method disclosed the fair value. As for the comparability analysis, an average level for the sample was verified according to the first approach of the T and H indexes, but with values very close to a low level.

Keywords: Comparability. Accounting Choices. Investment Property.

1 INTRODUCTION

The growth of capital markets in different countries has promoted a greater concern about the disclosure of relevant information to attract new investors and increase the level of confidence of companies in the market (Vaz, Gonçalves, Niyama, & Gonçalves, 2010). Thus, international standards, called *International Financial Reporting Standards* (IFRS), elaborated by the *International Accounting Standards Board* (IASB), have as objective the harmonization of accounting standards. In Brazil, the process of convergence began with the adoption of the Law No. 11.638/2007, but only from 2010 on, the instructions were required (Thomaz, Kronbauer, &

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Schneider, 2015).

According to Cairns, Massoudi, Taplin and Tarca (2011), one of the main objectives of adopting IFRS is to improve the comparability of financial reports. This qualitative characteristic improves the usefulness of accounting information, as it allows the comparison of financial reports between different entities or between the same entity in different periods (CPC 00 R1, 2011). In order to enable comparability, some norms allow the company to opt for the method of accounting for certain items, that is, they provide *accounting choices*.

The technical pronounce CPC 28 (2009) (*International Accounting Standard* [IAS] 40) deals with properties for investment (PPI) and allows the accounting choice between the cost method and the fair value in the measurement after the initial recognition of these Properties, which are maintained for obtaining income and/or capital valuation.

> Property for investment is the property (land or building – or part of building – or both) maintained (by the owner or by the tenant in financial leasing) to earn rent or for valuation of the capital or for both, and not for:
> (a) Use in the production or supply of goods or services or for administrative purposes; or
> (b) sale in ordinary business course.
> Property occupied by the owner is the property held (by the owner or by the tenant under financial leasing) for use in the production or supply of goods or services or for administrative purposes. (CPC 28, 2009, p. 3)

As the existence of accounting choices in the measurement of PPI can influence the comparability of information among financial reports, this study presents the following research problem: What is the level of comparability of the measurement after Initial recognition of the investment properties of open companies listed in Brazil, Bolsa, OTC (B3)?

In this context, the general objective is to verify the level of comparability of the measurement after the initial recognition of the investment properties of the companies listed in B3. On the other hand, specific objectives can be defined as: (i) identify the method used to measure the properties for investment; (ii) to ascertain compliance with the purpose of disclosure of the fair value provided for in CPC 28 (2009) and (iii) to analyze the comparability level of the companies listed in B3.

The research is justified because, despite the harmonization of accounting standards defined by international norms, the flexibility in measuring PPI can influence the quality and comparability of information. Thus, the lack of equivalent standards can impair the relevance of information and decision making of internal and external users.

Thus, the study intends to contribute to the research line that evaluates the influence of accounting choices in the comparability of financial reports of Brazilian companies, contributing to the literature through the use of indexes of comparability. Few studies are concerned with the measurement of the level of comparability by means of indices, which reveals the existence of a gap in the theme.

Considering that CPC 28 (2009) allows alternative methods in the subsequent measurement of the initial recognition of PPI, and that the CPC 00 R1 (2011) Highlights comparability as a qualitative characteristic that must be present in the accounting information, the Results of this research also seek to motivate the reflection on the part of regulators about the usefulness and impacts of accounting choices in financial reports.

2 THEORETICAL FRAMEWORK

2.1 Comparability and accounting choices

The accounting information has as one of the main objectives the assistance to users in decision making, such as investment decisions or even for credit operations (Pereira, 2013). Thus, to be relevant, such information should present equivalent standards with regard to measurement and evaluation, so that they are comparable, regardless of the entity, the country or even the period analyzed (Araújo, Souza, & Lemes, 2015; Rabbit, Campagnoni, & Rover, 2016).

According to the Conceptual Framework for the Elaboration and Dissemination of Accounting-Financial report-CPC 00 (R1), elaborated by the Accounting Pronouncements Committee (CPC) in 2011, comparability is presented as one of the qualitative characteristics Responsible for improving the usefulness of information provided to internal and external users and by advising the choice between equivalent alternatives in relation to the relevance and reliability of the information. In addition, verifiability, timing and comprehensibility are highlighted.

This improvement feature makes accounting information more useful from the time it can be compared between different entities or between the same entity in distinct periods. It is important to emphasize that this qualitative characteristic presupposes the existence of at least two items in order to identify and comprehend their similarities and differences (CPC 00 R1, 2011). The Conceptual Framework still highlights that: "although a singular economic phenomenon can be represented with the reliability of multiple forms, the discretion in choosing alternative accounting methods for the same economic phenomenon decreases comparability" (CPC 00 R1, 2011, item QC 25, p. 18) .

In this sense, international norms recognize that alternative accounting methods, known in the literature as *"accounting choices"*, influence the comparability of information. According to Fields, Lys and Vincent (2001), an accounting choice can be defined as any decision that aims to influence the *output* of an accounting system, in relation to financial statements, tax returns and regulatory documents.

Botinha and Lemes (2016) sought possible explanations that justified the choice in the face of different accounting methods. Based on the positive theory of accounting, we identified the presence of three hypotheses that influence accounting choices: Incentive plan, degree of indebtedness and size or political costs. The first hypothesis proposes that the administrators will opt for the alternative that increase the profit, adding values for their remuneration and bonuses. The hypothesis of the degree of indebtedness suggests that companies with a higher level of indebtedness will seek choices that increase profits to, for example, capture investments. The latter, in turn, indicates that the largest companies will prioritize accounting methods that reduce profit to lower costs and political attention.

Besides this empirical perspective-positivist, Pinto, Martins e Silva (2015) and Botinha and Lemes (2016) approached the influence of the *status quo* for explanations of accounting choices, which represents the maintenance of a decision to represent an information Accounting, preventing the change to avoid costs and risks and remain in the "comfort zone". It is noteworthy that the existence of alternative methods, although in some cases assisting the company, influences the decision making of internal and external users, hinders the application of the qualitative characteristic of comparability by allowing different Forms of measurement for similar facts and reduces the usefulness of accounting information (Andrade, Silva, & Malaquias, 2013).

Fearnley and Gray (2014), in order to investigate the adoption and implementation of IFRS in the European Union, by examining the ways of measuring PPI from 66 companies, in the period 2005 to 2010, found that national institutional factors and values Continue to be more important to explain accounting choices in the measurement of PPI in relation to legal factors and the development of the stock market. In this way, it is possible to verify the factors that justify why many companies maintain the approach of the cost method in measuring the properties for investment.

Accounting choices can be observed in accounting for customer loyalty programs (Araújo *et al*., 2015); In measuring, evaluating and evidencing inventories (Coelho *et al*., 2016); In the accounting treatment of intangible assets (Souza, Silva, & Costa, 2013) and in the measurement of biological assets (Botinha, Santos, & Lemes, 2013). The focus of this study is the accounting choice existing in the measurement after the initial recognition of PPI.

Research on comparability is mainly divided into two aspects: The Strand that evaluates the impact of IFRS adoption on internal accounting variables and the capital market, analyzing the improvement of comparability, and identifying the level of Comparability from the existence of accounting choices in companies (Souza & Lemes, 2016). According to Cole, Branson and Breesch (2008, 2009), comparability can be measured by techniques based on indexes or statistical models, and the authors explore characteristics of indices H, C, I, V and T.

Van der Tas (1988) was responsible for introducing the first indices of measurement of the comparability of the financial statements: Indexes H, C and I. The Herfindahl Index (h) was initially developed by Herfindahl, as a measure of concentration Industrial, and adjusted by Hirschman, but introduced only in 1988 by Van der Tas. This is a concentration index that ponders the relative frequencies of each accounting method. The relative frequency is obtained by dividing the number of companies opting for a given accounting practice and the total number of companies. The H-index reveals greater comparability when companies concentrate on a single method, and their values range from 0 to 1.

The comparability index (C), also introduced by Van der Tas (1988), is based on the number of pairs of compatible companies and the number of possible pairings. This index measures the probability that two randomly selected companies have comparable accounts, varying between 0 and 1, and can match the H index if the number of firms is sufficiently large and there are no multiple reports (Cole *et al.*, 2008, 2009).

Index I represents a concentration index, as well as H, and emerged as a measure of international comparability of materials. It is important to highlight that this index is one of the most criticized among those introduced by Van der Tas (1988). It indicates the degree to which companies belonging to a country apply it or only a limited number of alternative methods, compared to companies from other countries. This index does not take account of multiple accounting reports, since the company can be associated only with an alternate method. In addition, it ignores non-disclosure, does not present partial comparability and its values fluctuate between 0 and 1 (Cole *et al.*, 2008, 2009).

In addition to the indices of Van der Tas, Krisement introduced in 1997 the Entropy Index, an alternative method of concentration index. Entropy is an inverse measure of the degree of comparability. Thus, when entropy is at its maximum level, the level of comparability is considered to be minimal. Subsequently, the V index was developed to determine whether there are small differences between regions when accounting practices are compared (Cole *et al.*, 2008).

The last index stands out as one of the most important and complete in researches about the level of comparability: The T-index, introduced by Taplin (2004), and which includes all the possibilities of the previous ones, representing the probability of two companies Randomly selected account for comparable accounts. In 2006, Taplin developed the Harmoniser Software, an Excel spreadsheet, with the objective of calculating the index (Cole *et al.*, 2008). Table 1 shows the main characteristics of the comparability indexes H, C, I, V and T.

Table 1
Characteristics of Comparability Index

Characteristics of Indexes	H	C	I	V	T
Consider the number of surveyed companies	Yes	No	No	Yes	Yes
Consider the size of the countries examined	No	No	No	No	Yes
Consider the non-disclosure (*non-disclosure*)	Yes	Yes	Yes	No	Yes
Considers multiple accounting choices	No	Yes	No	No	Yes
Consider the partial comparability	No	No	No	No	Yes
Sensitivity to zero frequency	No	No	Yes	No	No
National Comparability (N), International (I) or both (A)	N	N	I	I	A
Ability to determine a probability interval	No	No	No	No	Yes
Allows the sector analysis with weights	No	No	No	No	Yes

Source: Adapted from Cole, V., Branson, J., & Breesch, D. (2008). An analysis of methods to measure the comparability of the consolidated financial statements of the European listed companies from the viewpoint of user. *Accountancy & Bedrijfskunde*, *28*(3), 1-31; Cole, V., Branson, J., & Breesch, D. (2009). How to measure the comparability of financial statements?. *International Journal of Managerial and Financial Accounting*, *1*(4), 379-397; and Souza, F. E. A., & Lemes, S. (2016). Comparability of accounting choices in the subsequent measurement of fixed assets, intangible assets and investment properties in South American companies. *Revista Contabilidade & Finanças*, *27*(71), 169-184. (2018).

Thus, it is perceived that the level of comparability of accounting information can be evaluated by means of different indexes, but those proposed by Van Der Tas (1988) and Taplin (2004) are highlighted. Araújo *et al.* (2015), Souza, Silva and Rech (2015) and Botinha *et al.*

(2013) applied the H index (*Herfindhal*), while Coelho *et al.* (2016) and Souza, Botinha, Silva and Lemes (2015) used the index T.

2.2 Investment properties

The property for investment (PPI), item regulated by the technical Announcement CPC 28 (2009), referring to the *International Accounting Standard* (IAS 40, *Investment Property*), can be understood as the property retained to obtain rents and/or value capital. It differs from the property occupied by the owner because it is not used for use in the production, supply of goods and services or administrative purposes, and also for generating cash flows independent of other assets belonging to the entity (CPC 28, 2009).

CPC 28 (2009, p. 3 and 4) cites some examples of PPI, such as "land maintained for long-term capital appreciation and not for short-term sale in the ordinary course of business" and "building that is vacant, but maintained to be leased under one or more leased operating systems."

As for the measurement, the PPI initially must be recognized by the cost – the purchase price and expenditures, such as professional remuneration of legal services, transfer taxes and others. After the initial recognition for the cost, these properties can be measured at fair value or by cost, through the choice of accounting policy adopted by the entity (CPC 28, 2009). The fair value is defined as "the price that would be received for the sale of an asset or that would be paid for the transfer of a liability in a non-forced transaction between market participants of the measurement date" (CPC 28, 2009, p. 2).

The entity is obliged to disclose whether the cost method or the fair value method is applied in the subsequent measurement of the initial recognition of these properties, in addition to other information, according to item 75 of CPC 28 (2009). It is important to highlight that, even if the entity chooses the cost method, it is mandatory to measure the fair value of PPI for disclosure purposes. If the choice is by the fair value method, the purpose of measurement is occurring. Thus, it appears that there is an "incentive" for measurement through fair value policy, since the entities are obliged to measure it independently of the chosen method.

Since the measurement of PPI after initial recognition can be performed in two different ways, it is identified the presence of accounting choices that can directly influence the comparability of the financial statements of companies of equal or different countries. The IASB stated that it allowed the use of the options between the cost method and the fair value method by countries with less developed markets and that could have a greater difficulty in adopting fair value (Costa, Silva, & Laurencel, 2013). Thus, it is assumed that the fair value method is preferable by the IASB and that the most developed markets tend to use this policy for posterior measurement of PPI. However, several studies apply in this area, analyzing which method is more applied and defending those who consider representing a more relevant accounting information.

2.3 Previous studies

The accounting choice between the cost method and the fair value method in the measurement of PPI and its reflection in the qualitative characteristic of comparability was studied in national and international articles, which contributed significantly to the area. While some seek to verify which method is most applied between different countries or between the same country, others seek to identify the explanatory factors for the accounting choice or even check the level of disclosure of properties against the rules of CPC 28 (2009).

Costa *et al.* (2013) sought to investigate what are the economic incentives for choosing the accounting method in the measurement of PPI, demonstrating the occurrence of each accounting method and the quality of the information disclosed, according to the requirements of CPC 28 (2009). In the sample of 36 Brazilian non-financial public companies, the authors identified that 39% adopted the fair value method. Moreover, the economic incentive found in the study was the size of the company, represented by the net revenue. Regarding disclosure, the study identified that 68% of the companies opting for the cost method disclosed the fair value in explanatory notes.

In this way, the authors concluded that companies belonging to the same sector presented different accounting choices in the measurement of PPI, and that the level of disclosure compliance, according to CPC 28 (2009), is below the expected. Such findings affect the comparability of financial statements, since users are at risk of making decisions based on information raised by different methods, and incomplete disclosure deprives them of access to important information. The study also confirmed the hypothesis of incentive plans, because companies with lower net revenues tend to measure their properties by the fair value method, increasing the result.

Analyzing the accounting choices for PPI, during the years 2009 and 2010, of 39 companies belonging to the stock exchange, commodities and futures of São Paulo (BM & FBovespa) and possible significant variables related to the method, Andrade *et al.* (2013) verified that 44% adopted the fair value method and, consequently, 56% adopted the cost method. Besides that, it was concluded that none of the study variables was related to the accounting choice for PPI measurement.

Kolozsvari, Marques and Macedo (2014) studied the real estate segment of commercial enterprises seeking to define the impact of choice between the options of measurement policies in the IPs in the results of companies. Through a form of calculation to compare results before taxes, the study illustrated that companies that use fair value for measurement have better results and profitability.

The article by Silva, Fonseca and Nogueira (2014) presented as objective the study of the level of conformity of companies during the exercise of 2012, according to the disclosures required by the technical Announcement CPC 28 (2009). Thus, the authors found that the level of disclosure of the companies opting for the cost method was more satisfactory than that of the companies that opted for the fair value method. The companies belonging to the branch of real estate exploitation were those with the highest percentage of disclosure, since they presented more significant values for PPI. In addition, the study identified difficulties in evidencing PPI in financial statements and explanatory notes, affecting the comparability of information and decision making of investors.

Souza *et al.* (2015) studied the degree of comparability and the determinant factors for the accounting choice of measurement, after the initial recognition for PPI, of Brazilian and Portuguese open companies between 2010 and 2012. Through the T Index (*T index*) for the measurement of national and international comparability and the parameters established by Souza *et al.* (2013), it was found that the Brazilian comparability is considered average and has been decreasing. Although they also presented an average comparability, Portuguese companies had stable values between 2010 and 2012.

From an analysis of the annual reports published in 2008 by 96 Chinese companies, Taplin, Yuan and Brown (2014) found that half uses the fair value to measure the properties for investment. Through the T-index, the authors found that companies with international influence that is, with international transactions and/or listed in global stock exchanges, are more likely to use the measurement at fair value.

The international comparability between Portugal and Brazil, in the study of Souza *et al.* (2015), was characterized as mean, with values close to a low and decreasing comparability over the years. Regarding the explanatory variables for the choice of the accounting method, the study identified *big four*, country, indebtedness, relevance of the balance of the properties and net income. The article presented as one of the main contributions to the use of the T index.

In order to identify the possible characteristics for accounting choices in open companies of BM & FBovespa and NYSE in PPI in the year 2013, Botinha and Lemes (2016) concluded that there was a greater use of the cost method by companies in both stock and that the significant variables for accounting policy decision were *big four*, company size, relevance of the PPI balance and the Telecommunications sector.

The authors found results that provide evidence of the existence of a *status quo*, which relates to the "comfort zone", and did not recognize that companies belonging to more developed markets would have greater acceptance to fair value, since the percentages To adopt this method between NYSE – the most developed capital market – and BM & FBovespa were close.. As for the purpose of disclosure of fair value, Botinha and Lemes (2016) found that

68% of the companies opting for the cost method respect the obligation present in CPC 28 (2009) regarding the accounting *disclosure* of PPI, but the scenario of the two stock exchanges Presented distinct. While on the NYSE 86% of the companies disclosed the fair value, at BM & FBovespa only 55% of the companies did. In addition, the study contributed to the theme through information about the positive theory of the accounting of Watts and Zimmerman (1986) and the theory of the agency.

Kwinto and Voss (2016), through the study of the forms of recognition, measurement and dissemination and the way of presenting information about PPI in the standardized financial statements, found that approximately 90% of the companies belonging to the largest groups of the *Warsaw Stock Exchange*, use the cost method in the measurement of PPI, and that the low rate of application of the fair value method may be related to the difficulty in measuring and the fact of being in use in a short period of time.

National research on PPI is mainly concerned with the investigation of variables that may explain the accounting choice between the cost method or fair value in the measurement after initial recognition. It is possible to observe that few of them applied comparability indexes, which reveals a gap in the theme. Thus, it is justified to investigate the comparability of PPI measurement, which influences the relevance of accounting information and decision making of internal and external users.

3 METHODOLOGICAL PROCEDURES

This article has as characteristic a descriptive methodological classification because it studies the behavior of companies regarding the choice between the methods of measurement of PPI. Descriptive research seeks to report aspects of a population or phenomenon and even establish connections between the analyzed variables (Gil, 2008).

As for the procedures, the survey represents a *survey*. According to Martins and Theóphilo (2009, p. 60), "the surveys are proper for the cases in which the researcher wants to answer questions about the distribution of a variable or the relationships between characteristics of people or groups". The methodological approach is identified as quali-quantitative, as it presents quantified data and analyzed by means of statistical techniques and others that represent non-susceptible descriptions (Martins & Theóphilo, 2009).

The study population includes the 457 open companies listed in B3, belonging to ten distinct sectors. It is important to highlight that 13 companies that did not present standardized financial statements (DFP) dated 31/12/2015 were excluded. For the definition of the sample, information was collected regarding the existence of PPI in the DFP and explanatory notes (NE), and the companies that presented balances for these properties were selected in the 2015 social year.

Table 2 shows the total number of companies per sector listed in B3 and the quantity of companies that have and do not have a balance for PPI in the year 2015. Thus, it is concluded that of a total of 457 organizations, the study sample consists of 91 companies from the ten distinct sectors listed. In addition, it is verified that the sample represents 20% of the population and that the sector with the highest percentage of companies with a balance in PPI is non-cyclical consumption.

Table 2
Population and Sample

Sector	NOTE	No. Companies without PPI	%	No. Companies with PPI	%
Industrial Goods	76	65	(86%)	11	(14%)
Cyclical Consumption	85	65	(76%)	20	(24%)
Consumption Not Cyclical	20	13	(65%)	7	(35%)
Financial and Other	135	109	(81%)	26	(19%)
Basic Materials	34	29	(85%)	5	(15%)
Oil, Gas and Biofuels	11	9	(82%)	2	(18%)
Health	13	10	(77%)	3	(23%)
Information technology	8	7	(88%)	1	(13%)
Telecommunications	7	6	(86%)	1	(14%)

Public Utility	68	53	(78%)	15	(22%)
Total	**457**	**366**	**(80%)**	**91**	**(20%)**

Source: Prepared by the authors (2018).

The data collection technique was content analysis, performed in the DFP and in the NE of the companies with respect to PPI. Thus, information was investigated regarding the value of PPI, the method chosen for measurement after initial recognition and the fulfillment of the disclosure requirement of the fair value of the companies that opted for the cost method, as stated in the CPC 28 (2009).

To verify the comparability level of the companies, the H index was applied, proposed by Van der Tas (1988), and the T Index (*T-Index*), proposed by Taplin (2004).. The H-index is calculated through the weighting of relative frequencies of the alternative accounting methods. The frequency of an accounting method comprises the number of companies that opt for this method. The relative frequency is obtained by the number of companies opting for a given accounting method divided by the total number of companies. Thus, the index reveals a higher level of comparability when companies concentrate on only one or a limited number of accounting practices (Van der Tas, 1988).

The form for calculating the H-index is presented in the Van Der Tas Survey (1988). The variable *n* represents the number of alternative accounting methods, and the variable *Pi* is the relative frequency of the accounting method *i*.

$$H = \sum_{i=1}^{n} p_i^2$$

Figure 1. Index General Formula H
Source: Van der Tas, L. G. (1988). Measuring harmonization of financial reporting practice. *Accounting and business research*, *18*(70), 157-169.

The T-index determines whether the accounting accounts of different companies are comparable, according to the chosen accounting methods (Coelho *et al.*, 2016). The general formula for calculating the T-index is presented in the study by Taplin (2004, p. 61):

$$T = \sum_{i=1}^{N}\sum_{j=1}^{N}\sum_{k=1}^{M}\sum_{l=1}^{M} \alpha_{kl}\beta_{ij} P_{ki}P_{lj}$$

Figure 2. Index General Formula T
Source: Taplin, R. H. (2004). A unified approach to the measurement of international accounting harmony. *Accounting and Business Research*, *34*(1), 57-73.

The formula variables are, according to Taplin (2004, p. 61):
αkl – the coefficient of comparability between the accounting methods k and l;
βij – the weighting for comparison between companies from countries i and j;
Pki – the proportion of companies in the country i k using the accounting method;
Plj – the proportion of companies in the country i k using the accounting method;
N – the number of countries (1 to N);;
M – the number of accounting methods (1 M).

The minimum value for the H-index and the T-index is 0, and indicates the level of non-comparability. The maximum value is 1, and indicates the total level of comparability. To interpret the values of the two indices, shown in table 3, the adapted scale was used, present in the research of Souza *et al.* (2015) and Souza *et al.* (2013).

Table 3
Interpretation of the index H and T

Index T	Level of comparability
Between 0.700 and 1.000	High
Between 0.500 and 0.699	Average

Between 0.000 and 0.499	Low

Source: Souza, F. E. A., Botinha, R. A., Silva, P. R., & Lemes, S. (2015). Comparability of accounting choices in the subsequent evaluation of investment properties: an analysis of Brazilian and Portuguese listed companies. *Revista Contabilidade & Finanças*, *26*(68), 154-166. (2018)

The H-index was calculated by means of *Microsoft Excel* and T-index using the *T-index Calculator* program, made available by Professor Ross H. Taplin by e-mail address. The following options were used for calculating the T-index: 1 (b) reflection of company/Country: countries are reflected equally; 2 (a) International focus: comparisons are made between all companies regardless of their country; 3 (a) several accounting policies: multiple accounting policies are not allowed, as they are comparable only to themselves; and in step 4, the options (a), (b) and (c) were chosen, which generated three different T-index approaches and which will be analyzed in the study (Taplin, 2004).

4 RESULTS ANALYSIS

4.1 Methods of measurement of investment properties

The sample companies that presented balances for PPI in the social exercise of 2015 were initially analyzed for the measurement method. Table 4 shows the number of companies per sector that opted for the cost method, the fair value method, or that did not disclose the method.

Table 4
Method of Measurement of PPI in 2015

Sector	Cost	%	Fair value	%	Non-disclosed	%	Total
Industrial Goods	4	(36%)	6	(55%)	1	(9%)	**11**
Cyclical Consumption	5	(25%)	9	(45%)	6	(30%)	**20**
Consumption Not Cyclical	3	(43%)	4	(57%)	0	(0%)	**7**
Financial and Other	14	(54%)	10	(38%)	2	(8%)	**26**
Basic Materials	2	(40%)	2	(40%)	1	(20%)	**5**
Oil, Gas and Biofuels	0	(0%)	2	(100 %)	0	(0%)	**2**
Health	1	(33%)	0	(0%)	2	(67%)	**3**
Information technology	1	(100%)	0	(0%)	0	(0%)	**1**
Telecommunications	1	(100%)	0	(0%)	0	(0%)	**1**
Public Utility	5	(33%)	0	(0%)	10	(67%)	**15**
Total	**36**	**(40%)**	**33**	**(36%)**	**22**	**(24%)**	**91**

Source: Prepared by the authors (2018).

It is possible to verify, in Table 4, that 100% of the sectors of Information Technology and Telecommunications applied the cost method. However, as each sector encompasses only one company, this information is not relevant to the study. The financial sector and others counted with 14 companies opting for the cost method among 26 analyzed, i.e. 54% of the companies chose the method. The number can be explained by the fact that the sector includes the segments related to the real estate, the focus of other studies, such as that of Kolozsvari *et al.* (2014). This sector is the one with the largest number of companies in the sample studied (26) and also the largest number of companies that applied the cost method (14). Kwinto and Voss (2016) found that approximately 40% of the Warsaw Stock Exchange Financial services companies applied the fair value method in measuring PPI.

Through the analysis of the companies that applied the fair value, it appears that 100% of the companies in the oil, gas and biofuels sector – which covers two companies – opted for this method. It is also noted that the companies belonging to the health and public utility sector did not use this method of measurement and their rates of non-disclosure of the method, according to item 75 of CPC 28 (2009), were the highest (67% of the companies in the sector sample). In addition, it is verified that the sectors of Industrial Goods, Cyclical Consumption, Non-cyclical Consumption and Oil, Gas and Biofuels presented more companies that chose as a method of measurement for PPI the fair value in relation to the cost.

Among a total of 91 companies analyzed, 69 disclosed and 22 did not disclose the method chosen to measure PPI. Thus, 24% of the companies do not comply with the item 75 exposed by CPC 28 (2009), which addresses the obligation of the entity to disclose the adopted method. In addition, 36 companies applied the cost method (40%) and 33 applied the fair value method (36%). If the companies that did not disclose the measurement method were disregarded for analysis, 52% opted for the cost and 48% at fair value. In this way, most companies opted for the cost method, but there is little difference in application between the methods and the high rate of non-disclosure.

It is important to verify whether the companies studied complied with CPC 28 (2009) regarding the mandatory disclosure of fair value, either by purpose of measurement or by purpose of disclosure (opting for the cost method). Thus, table 5 shows the companies that applied the cost method for measurement after the initial recognition of PPI.

Table 5
Fair value disclosure to Companies by the Choosers cost in 2015

Sector	Cost	Fair Value Disclosure	% Fair Value Disclosure
Industrial Goods	4	4	(100%)
Basic Materials	2	2	(100%)
Health	1	1	(100%)
Information technology	1	1	(100%)
Telecommunications	1	1	(100%)
Financial and Other	14	8	(57%)
Public Utility	5	2	(40%)
Consumption Not Cyclical	3	1	(33%)
Cyclical Consumption	5	1	(20%)
Oil, Gas and Biofuels	0	0	–
Total	**36**	**21**	**(58%)**

Source: Prepared by the authors (2018).

It appears that 100% of the companies in the industry of industrial goods, basic materials, health, information technology and telecommunications – who adopted as accounting choice in the measurement of PPI the Cost method – fulfilled the purpose of disclosure of fair value. The Cyclical Consumption sector presented the lowest disclosure index (20%), since, among five companies that applied the cost method, only one disclosed the fair value of PPI. It is perceived, by analyzing the total values, that among the companies that compose the sample, without distinction of sectors, 58% meet the mandatory disclosure of the fair value. In other words, among the 36 companies that applied the cost method, 21 disclosed the fair value in addition.

4.2 Comparability level

The T-index allows to demonstrate the level of comparability to the accounting methods applied by the sample companies. Taplin (2004) evidences the existence of different approaches for calculating the T-index when the sample includes companies that did not disclose the accounting method chosen (*non-disclosure*), based on the premise that the non-disclosure is the last accounting method. The first approach (T1) excludes companies that did not disclose the accounting method for calculating the index. The removal of non-disclosure may be reasonable when the intention is to measure the level of comparability of the companies for which this accounting policy represents a problem (Taplin, 2004). In this way, the T1 index will present the comparability among the companies that presented the method of measuring PPI.

The second approach (T2) includes all the companies in the sample, that is, companies that did not disclose the accounting method adopted are considered comparable to all others, regardless of the method. According to Taplin (2004), this approach is reasonable if it is accepted the idea that non-disclosure is the result of a non-applicability. Thus, the accounts of a company that did not present the accounting method should be compared to any other companies.

In the third approach (T3) The non-disclosure is not comparable to any of the other accounting methods. Coelho *et al.* (2016) clarify this approach by exposing that companies that did not inform the chosen accounting method are considered for calculating the index, but are not compared to other organizations.

Thus, as the sample of the present study counted on companies that did not disclose the accounting method adopted to measure PPI, the three approaches previously presented for each sector were calculated. The values of the T indices obtained are shown in table 6, as well as the interpretation according to the scale addressed in the chapter of the methodological procedures.

Table 6
Index T and Level of Comparability of Sectors

Sector / index	T1	Level	T2	Level	T3	Level
Oil, Gas and Biofuels	1.00	High	1.00	High	1.00	High
Information technology	1.00	High	1.00	High	1.00	High
Telecommunications	1.00	High	1.00	High	1.00	High
Health	1.00	High	1.00	High	0.11	Low
Public Utility	1.00	High	1.00	High	0.11	Low
Cyclical Consumption	0.54	Average	0.78	High	0.26	Low
Financial and Other	0.51	Average	0.59	Average	0.44	Low
Industrial Goods	0.52	Average	0.60	Average	0.43	Low
Consumption Not Cyclical	0.51	Average	0.51	Average	0.51	Average
Basic Materials	0.50	Average	0.68	Average	0.32	Low

Source: Prepared by the authors (2018).

According to table 6, it is possible to verify that the oil, gas and biofuels, information technology and telecommunications sectors presented a T-index of harmony, regardless of the approach, in the value of 1.00. That is, companies have a total level of comparability. The indices were similar in the three approaches, since there were no non-disclosure cases regarding the PPI measurement method. Moreover, it is important to highlight that there are few companies in the general sample belonging to these sectors (2 – oil, gas and biofuels; 1 – Information technology; 1 – telecommunications).

The health and public utility sectors presented similar T indices: T1 and T2 were equal to 1.00 and T3 presented the value of 0.11. In this way, the first two approaches indicate high comparability, but the last approach reveals a low comparability. This fact can be explained by the high representativeness of companies in the sector that did not show the accounting method of measurement, and the fact that the others opted only for one of the two methods (in this case, the cost method).

The companies belonging to the cyclical consumption sector presented different levels of comparability, according to the approach: a mean comparability (T1), a high comparability (T2) and a low comparability (T3). The value of the T-index of Harmony obtained by the first approach – in which companies that did not disclose the method are ignored in the calculation – reveals that if two companies in this sector are randomly selected, there is 54% chance that they will adopt the same method in Measurement of PPI. In this way, it conceptualizes as a mean level of comparability. Regarding the value of the T2 index (0.78), a high comparability was revealed among the companies in the sector.

The Financial and Other sector, which covers the largest number of companies in the sample, presented a level of average comparability by the optics of the first two approaches and a low comparability level by the last approach. The interpretation of T1 allows to conclude that there is 51% chance of two separate companies randomly measuring the PPI by the same accounting method, either the cost method or the fair value method.

Companies in the industrial goods sector have a mean comparability, according to the first two approaches of the T-index, and a low comparability, according to the third approach. The non-cyclical consumption sector presented an average comparability and the same values for the three different approaches, because all companies disclosed the accounting method adopted, with the probability of 51% of two companies adopting the same method of measurement . Lastly, the basic materials sector presented an average level of comparability in T1 and T2 and a low comparability in T3.

Although Van der Tas (1988) did not show in his studies the presence of different approaches for calculating the H-index, when in the sample are companies that did not disclose the accounting method for measurement, the present research defined two approaches for The index, with the purpose of comparing the results between this index and the one presented by Taplin. The first approach (H1), as well as T1, excludes companies that did not disclose the accounting method for the index, and the second approach (H2) includes all companies, adopting non-disclosure as one of the existing accounting methods.

Table 7 shows the relative frequencies for the methods of cost and fair value in the measurement of PPI, excluding companies that did not disclose the method to define the values of the H1 index per sector. In addition, the table presents the interpretation of the index values according to the scale defined in the methodological procedures.

Table 7
Index H1 and Level of Comparability of Sectors

Sector	Relative cost frequency	Relative Frequency fair value	H1	Level
Oil, Gas and Biocomb.	0.00	1.00	1.00	High
Information technology	1.00	0.00	1.00	High
Telecommunications	1.00	0.00	1.00	High
Health	1.00	0.00	1.00	High
Public Utility	1.00	0.00	1.00	High
Cyclical Consumption	0.36	0.64	0.54	Average
Industrial Goods	0.40	0.60	0.52	Average
Consumption Not Cyclical	0.43	0.57	0.51	Average
Financial and Other	0.58	0.42	0.51	Average
Basic Materials	0.50	0.50	0.50	Average

Source: Prepared by the authors (2018).

As the Herfindahl index represents a measure of concentration, a higher level of comparability will occur when companies concentrate on only one or a limited number of accounting methods (Van der Tas, 1988). As well as the companies belonging to the sectors of oil, gas and biofuels, information technology, telecommunications, health and public utility, when concentrating on only one of the accounting practices in the measurement of PPI, they presented a total level Comparability.

The sectors of Cyclical Consumption, Industrial Goods and Non-cyclical Consumption presented a relative frequency for the superior fair value method in relation to the relative frequency for the cost method and a mean comparability level. It stands out in these cases that, the higher the relative frequency for the fair value, the higher the values recorded in the H index. The financial sector and others presented a higher relative frequency for the cost method and a mean level of comparability. As for the companies in the basic materials sector, as the relative frequency was equal between the two methods, the value of the H index was 0.50.

It is important to emphasize that the values of the H1 index are similar to the values of the T1 index for the following reasons: both discarded from the sample the companies that did not disclose the accounting practice adopted in the measurement of PPI (*(non-disclosure*), and the research analyzed Companies in a single country.

The values referring to the second approach of the H-index and the interpretations about the level of comparability, as well as the relative frequencies for the methods of cost, fair value and undisclosed method, are presented in table 8.

Table 8
Index H2 and Level of Comparability of Sectors

Sector	Relative cost frequency	Relative Frequency fair value	Frequency relative method not disclosed	H2	Level
Oil, Gas and Biocomb.	0.00	1.00	0.00	1.00	High
Information technology	1.00	0.00	0.00	1.00	High
Telecommunications	1.00	0.00	0.00	1.00	High
Health	0.33	0.00	0.67	0.56	Average
Public Utility	0.33	0.00	0.67	0.56	Average
Consumption Not Cyclical	0.43	0.57	0.00	0.51	Average
Industrial Goods	0.36	0.55	0.09	0.44	Low
Financial and Other	0.54	0.38	0.08	0.44	Low
Cyclical Consumption	0.25	0.45	0.30	0.36	Low
Basic Materials	0.40	0.40	0.20	0.36	Low

Source: Prepared by the authors (2018).

According to table 8, it is verified that the sectors of Oil, Gas and Biofuels, Information Technology and Telecommunications presented a zero relative frequency for the undisclosed method and a total level of comparability since the companies Were concentrated in only one of the possible methods for measuring PPI. The Health and Public Utility sectors portrayed the highest frequency concentrations for the undisclosed method and null frequency for the fair value method, in addition to a mean level of comparability (0.56). All companies belonging to the Non-cyclical Consumption sector disclosed by which method they opted to measure PPI, and the value of the H index indicated an average level of comparability for the sector. The H2 values for companies belonging to the financial and other sectors, cyclical consumption and basic materials have portrayed a low level of comparability between the financial statements of each sector.

Table 9 presents the three T-index approaches and the two H-index approaches for the sample covering 91 companies. The comparability scale used is present in the studies by Souza *et al.* (2015) and Souza *et al.* (2013).

Table 9
T and H Index Sample

Sample/Index	T1	Level	T2	Level	T3	Level	H1	Level	H2	Level
91 companies	0.50	Average	0.71	High	0.29	Low	0.50	Average	0.35	Low

Source: Prepared by the authors (2018).

The first approach of the T-index, which disregards to the calculation basis, the companies that did not disclose the accounting method for measuring PPI, indicates a mean level of comparability, but with value very close to that of a low comparability. CAs the study used companies from a single country, and the first approach of the H-index also excludes *non-disclosure* in the reckoning, the values of T1 and H1 were equal. The interpretation of these indexes can be made so that, if two companies are randomly chosen, there is 50% chance of them adopting the same accounting method.

The second approach of the T-index, which includes all the sample companies regardless of non-disclosure, reveals a high level of comparability, and the third approach (0.29) reveals a low level of comparability. The second approach of the H-index, which also includes all the companies in the sample, revealed a low comparability by means of the value of 0.35.

5 CONCLUSIONS

International financial Reporting Standards (IFRS), issued by the *International Accounting Standards Board* (IASB), represented the starting point for the process of harmonizing accounting standards, in order to meet the growth of capital markets and, consequently, the demand for information that is increasingly relevant for users ' decision-making.

One of the qualitative characteristics that provide greater relevance and usefulness to accounting information is comparability, allowing the comparison of information between different entities or between the same entity in distinct periods of time. Thus, the existence of accounting choices, also known as accounting choices, can negatively influence the quality of information.

The investment properties – regulated by the technical pronouncements 28 (CPC, 2009) – are those maintained for rent and/or capital valuation and are characterized as one of the cases of accounting choices allowed by international norms. Through the questioning of the influence that alternative methods of accounting may have on the comparability characteristic, the study aimed to verify the level of comparability of the measurement after the initial recognition of PPI of Companies listed in B3. The sample consisted of 91 companies listed in ten distinct sectors of B3, which represent those with PPI balances in the social year of 2015 among a population of 457 companies.

Seeking to achieve the specific objective (i) to identify the method used in the measurement of PPI, it was found that most companies apply the Cost method (40%), but with little difference to the fair value method (33%), and that large part does not disclose the Accounting method Used (24%), disobeying one of the mandatory disclosure, according to CPC 28 (2009).

The results found in relation to the predominance of the cost method in the posterior measurement of the initial recognition of the properties will meet the studies of Costa *et al.*

(2013), Andrade *et al.* (2013) and Botinha and Lemes (2016). In addition, it was observed that 100% of the Telecommunications sector – despite including only one company – adopted the cost method, validating the article by Botinha and Lemes (2016), which verified the reduction of the probability of a company applying the fair value if it belongs to Telecommunications sector.

Through the investigation of the specific objective (ii), it was found that among the 36 companies belonging to the sample that applied the cost method in the measurement of PPI, 58% disclosed the fair value to meet the purpose of disclosure foreseen in CPC 28 (2009). The companies in the industrial goods, basic materials, health, information technology and telecommunications sectors attended 100% for the purpose of disclosure of fair value, while the companies in the cyclical consumption sector were those that presented the lowest rate of Disclosure (20%). In this way, the data are close to those found by Botinha and Lemes (2016): 55% of the companies respected the purpose of disclosure of fair value. Costa *et al.* (2013) concluded that 68% of the companies opting for the cost method disclosed the fair value, an index higher than that observed in this study.

To achieve the specific objective (iii), that is, to analyze the comparability level of the companies listed in B3, were used the three approaches of the T-index of Harmony, proposed by Taplin (2004), and two approaches of the H-index, introduced by Van Der Tas (1988). The sample in general presented a mean level of comparability in the first approach of the two indexes that disregards the companies that did not disclose the method, but with value very close to a low level. The interpretation of T1 and H1 (0.50) can be done in such a way that, if two companies are randomly selected, there is a 50% chance of them adopting the same accounting method. In relation to the second approach of the T-index, which includes all companies, a high comparability was recorded, and the third was a low comparability. As for the second H-index approach, a low comparability was revealed. The study corroborates the research by Souza *et al.* (2015), which verified a mean degree of comparability in Brazilian companies regarding the measurement of PPI. It is noteworthy that, for the present research, as it is not sought to verify the level of comparability between countries, the H index provides the necessary subsidies.

It is concluded that, despite the adoption of international IFRS standards in Brazil through Law No. 11.638/2007 and the process of harmonization of accounting standards, some companies belonging to B3 still do not respect the technical pronouncements 28 (2009) in its entirety , not divulging the method of measuring PPI or even not meeting the purpose of disclosure of fair value. In addition, some sectors presented a high level of comparability observed by the T-index, but the two sectors with the highest number of companies had a very close level at a low level.

In this aspect, agreeing with the study by Costa *et al.* (2013), a problem of comparability of accounting information is identified, since the level of disclosure compliance, according to CPC 28 (2009), has not yet reached its totality, and companies in the same sectors have different accounting choices In the measurement of PPI. In addition, as highlighted in the study by Silva *et al.* (2014), difficulties in evidencing these properties were found in demonstrations and explanatory notes, impairments the decision making of users of accounting information.

The article presented as limitations the year of analysis of the standardized financial statements of the B3 companies, the application of two comparability indexes and the verification of only two mandatory items of disclosure, according to CPC 28 (2009). It is recommended, therefore, for further studies, the extension of the study period, the application of other comparability indexes or statistical models and the verification of other mandatory items for compliance according to CPC 28 (2009).

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EFFECT OF FAMILY MANAGEMENT IN EVALUATION THE COMPANY'S PERFORMANCE: EVIDENCE FROM BRAZIL

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ABSTRACT

This research aims to verify the effect of family management in performance evaluation of Brazilian publicly traded companies belonging to the cyclical consumer sector listed in Brazil, Bolsa, Balcão (B3). For that, a descriptive, documentary research was conducted with a quantitative approach through the use of Multiple Linear Regression. The period of analysis comprised the years from 2012 to 2016. The study sample consisted of 34 Brazilian family companies and 66 non-family companies, totaling the 100 companies classified in the cyclical consumption sector. The results revealed differences between the family and unfamiliar companies regarding the accounting performance, since this variable was related in a significant and positive way with the performance measured by the ROA proxy. This result suggests that family companies seek over the years to improve the value of assets, since the higher the book performance, the more investors will be interested in family firms with expectations of long-term returns. Other evidence worth mentioning is the relationship between the size of the company and the market and accounting performance of family and non-family companies. In family firms, this finding indicates that the size of the company is related to these companies in the cyclical consumption sector, since they tend to be more efficient in the use of their assets, presenting a positive relation with performance. It is concluded that the market performance, as measured by the Tobin Q proxy, was one of the main measures of performance that lead companies to a high organizational performance.

Keywords: Family Business. Performance of the Company. Cyclical Consumption Sector. Brazil.

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1 INTRODUCTION

Family businesses contemplate two distinct environments, family and business, which leads these companies to constantly seek the balance between both (Beuren, Politelo, & Martins, 2016; Masri, Tekathen, Magnan, & Boulianne, 2017). In this sense, its peculiar characteristics significantly influence the company's objectives and the strategies implemented (Chua, Chrisman, & Sharma, 1999; Erbetta, Menozzi, Corbetta, & Fraquelli, 2013; Hiebl, Duller, Feldbauer-Durstmüller, & Ulrich, 2015), distinguishing them from non-family companies.

For national economies, family businesses are one of the most important kinds of business (Ayranci, 2014; Hiebl et al., 2015; Beuren et al. 2016). According to the *Family Firm Institute* (2015), in the Brazilian scenario 90% of private companies are family, and correspond to 50% of Gross Domestic Product (GDP) and 85% of the jobs generated. These however are distinguished from other companies by having a family involvement based on the conduct of business (Donckels & Frochich, 1991; Chua et al., 1999; Shyu, 2011).

Therefore, standards of ownership, governance, management and succession significantly influence the objectives of the family business and the strategies implemented (Chua et al., 1999; Mazzi, 2011). Gómez-Mejía, Haynes, Núñez-Nickel, Jacobson, & Moyano-Fuentes (2007) the potential advantages of these are the long-term organizational commitment, since they are concerned with the wealth contained in the perpetuation of family values through the business (Chua *et al.,* 1999; Shyu, 2011) and over the generations (Reyna & Encalada, 2016), which reflects the market performance and accounting of family businesses.

In these companies, family ties can create conditions for achieving differentiated performance compared to non-family members (Martínez, Stöhr & Quiroga, 2007; Shyu, 2011; Erbetta *et al*., 2013). Although there is evidence in the literature of the influence on business performance (Sharma, Chrisman, & Chua, 1997; Anderson & Reeb, 2003; Martínez et al., 2007; Amran & Ahmad, 2009; Bonilla, Sepulveda & Carvajar, 2010; Shyu, 2011; Din & Javid, 2011; Mazzi, 2011; Speckbacher & Wentges, 2012; Erbetta *et al*., 2013; Hamberg, Fagerland, & Nilsen, 2013; Pukthuanthong, Walker, Thiengtham, & Du, 2013; Muttakin, Khan, & Subramaniam, 2014; Ayranci, 2014; Vieira, 2014; Politelo, Kaveski, Chiarello, & Silva, 2014; Halili, Saleh, & Zeitun, 2015; Hiebl *et al*., 2015; Beuren et al., 2016; Kang & Kim, 2016; Poletti-Hughes & Williams, 2017; Saleh, Halili, Zeitun & Salim, 2017; Costa, Macedo, Yokoyama & Almeida, 2017), this configuration deserves to be better explored, since the presence of relatives in management implies better performances and support of the competitive advantage (Mazzi, 2011; Speckbacher & Wentges, 2012). In addition, the family can exert influence and control in the management of the company, having direct involvement in decisions, both strategic and operational (Gómez-Mejía *et al*., 2007; Sciascia, Mazzola & Kellermanns, 2014).

According to Pukthuanthong et al. (2013), despite the existing literature, the relationship between family management and market and accounting performances remains largely unresponsive, given the conflicting results about its impact on the company's value. These factors stimulate the development of this research, which sees a gap not yet fulfilled in the area of corporate finance. In addition, family businesses tend to have higher performance and profitability assessments than non-family companies (Anderson & Reeb, 2003), and there is still no evidence in the literature on the influence of the life cycle on the performance of the former, revealing Another opportunity for this study. Regarding this last aspect, Franks, Mayer, Volpin and Wagner (2012) found evidence that, in countries with strong investor protection and developed financial markets, family businesses evolve throughout their lifecycle for configurations Open capital as they ripen, while in countries with poor investor protection and less developed financial markets, family control is intense and lasting.

In this context, considering the importance of family businesses for the national economy, given their representativeness and particularities, this study seeks to clarify the effect of family management on the performance of Brazilian capital companies belonging to the cyclical consumption sector listed in the Brazil, Stock Exchange, Counter (B3).

According to Chahine (2007), although advantageous, the role of family control is poorly explored in corporate finances, and it is necessary researches that aim to analyze the connection between family business and its performance, since this relationship is complex

(Mazzi, 2011). Seeking to elucidate the aspects of this relationship, this study is also justified by the family companies being the most common form of organization in the world and, in general, family control can have a positive effect on business performance (Kang & Kim, 2016).

Given the representation of family businesses in the world economy (Zahra & Sharma, 2004), as well as its significant economic impact (Speckbacher & Wentges, 2012), the importance of these companies is undeniable for the social and cultural spheres (Acquaah, 2013). Moreover, because Brazil is an emerging country, national family companies have notorious participation in the economy, higher than developed countries (Politelo *et al*., 2014); factors that also justify the elaboration of this research.

In general, this paper contributes to the literature on market and accounting performances, because it focuses on the impact of family decisions on these indicators, considering new independent variables as determinants of performance, such as the cycle of Organizations ' lives. Thus, the empirical results of this study provide useful information for researchers, professionals and investors who operate in the capital market, regarding family and non-family businesses (Saleh et al., 2017).

2 PERFORMANCE OF FAMILY BUSINESS

Due to the predominance and representativeness of family businesses, and their significant economic impact (Speckbacher & Wentges, 2012) in both developed and developing countries, studies on the theory, research and practice of this area come intensifying over the last few years (Zahra & Sharma, 2004; Speckbacher & Wentges, 2012; Dawson & Mussolino, 2014).

However, it is still recurrent in the literature the ambiguity of definitions of family businesses due to their specificities (Chua et al., 1999; Shyu, 2011).

The family characteristic of these companies can, to a certain extent, affect their performance, since the majority of them are members of the family. Thus, indirectly, this configuration of the councils can affect the company's performance (Amran & Ahmad, 2009). In addition, many publicly traded companies are owned and controlled by their founding families (Burkart, Panunzi & Shleifer, 2003; Hamberg et al., 2013), being one of the most prevalent forms of property structure around the world, contributing strongly to their economies (Pukthuanthong et al., 2013). Thus, one of the main characteristics of family businesses is the influence of the family in the management of the company, whether direct (general administration is under family responsibility), or indirect (the family is not part of the management of the company, but integrates the board of directors or participates in administrative decisions) (Beuren, Hein & Boff, 2011). In this sense, the performance of companies is an important element of management, as it reflects on its competitiveness (Beuren, Politelo, & Martins, 2013).

Thus, family involvement is associated with a specific way of managing and controlling business operations (Ussman, 1996; Zahra, 2005; Holt, Rutherford, & Kuratko, 2010), which can present positive reflexes in the performance of family businesses. Consequently, and due to the intensity of family involvement, companies create a specific set of objectives that contemplate family interests and values (Ussman, 1996; Sharma et al., 1997; Gómez-Mejia et al., 2007; Shyu, 2011), in turn used to pursue the vision of the company (Donckels & Frochich, 1991; Chua et al., 1999; Sciascia et al., 2014) and achieve a combination of financial and non-financial goals, that is, the desired market and accounting performance (Sharma, 2004; Poletti-Hoghes & Williams, 2017).

Thus, family participation focuses on the need to exercise authority and control in the organization (Berrone, Cruz & Gomez-Mejia, 2012), and interfere with the company's performance. According to Speckbacher and Wentges (2012), family businesses have better performances than non-relatives, and consequently have a competitive advantage (Mazzi, 2011). In this sense, in comparison with non-family companies, family organizations, due to their peculiar characteristics, may present a differentiated economic-financial performance (Erbetta et al., 2013).

The performance of family businesses is consistent with performance in terms of business and family dimensions, considering any point of their life cycle (Sharma, 2004). Speckbacher and Wentges (2012) mention the conservative tendency of family businesses in strategic planning in the first years of life. However, over time they become more aggressive due to the competitive environment. According to Franks *et al*. (2012), family control is important because it dominates several financial markets around the world and, according to the vision of the life cycle, the determinants of family control interact with the age of the company, that is, with the life cycle that is found (Franks et al., 2012), denoting the relationship between both factors.

The research developed by Speckbacher and Wentges (2012) revealed that companies that have founding members acting as executives in general perform better than others. However, different strategies lead to the use of different types of performance indicators (Micheli & Mura, 2017). Thus, the performance differs in family and non-family businesses. Another delimiter of the use of financial indicators comes from the stage of the life cycle that the company is in, that is, the changes that the company suffers over time, such as organizational changes, standards of management control systems, characterized by developmental stages that may affect their performance (Dickinson, 2011; Costa et al., 2017), in addition to the way the organization, whether familiar or not, faces management challenges.

The evaluation of the performance of companies has excelled in the management of organizations, because it is accounting or market, it is essential for their survival (Macedo & Corrar, 2010), making the analysis of this of paramount importance, because it is essential for the control business management (Olson & Slater, 2002). Thus, it is necessary to understand the variables that influence the performance of family and non-family businesses, as proposed in this research. However, despite the relevance of evaluating the performance of companies in the literature, this theme has been the subject of discussion, especially with regard to the use of indicators (Macedo & Corrar, 2010).

In studies revisited and developed from family and non-family companies, accounting indicators such as return on assets (ROA), Return on equity (ROE), Market-to-Book, as well as *Tobin's Q*, were generally analyzed to identify market performance as well.

The research developed by Anderson and Reeb (2003) showed that family businesses present a *Tobin's Q* and a higher ROA when compared to non-relatives. Thus, the participation of family members in the management of companies reflects on their performance. With regard to the greater profitability, Maury (2006) investigated family and non-family businesses in Western Europe, revealing a greater profitability of the former compared to non-family companies.

The study by Andres (2008) analyzed the performance of family businesses in Germany, indicating that these are more profitable and have major shares in the financial market when compared to the other companies surveyed. However, the performance of family businesses is only better in those where the founding family is still active in the executive or fiscal council. In this sense, it is evident that family property relates to the company's higher performance only under these conditions. Moreover, when families are only large shareholders, without significant representation in the councils, the performance of these companies is not distinguished from the others.

Din and Javid (2011) investigated the influence of family involvement in the performance of public companies in Pakistan, through the accounting performance variables ROA and ROE. According to the results measured, there is a positive and significant relationship between the determinant factors of family business and its performance. The study by Shyu (2011) also aimed to evaluate the influence of family property on the performance of Taiwan's public companies, revealing that the performance measured by the *proxies* ROA and *Tobin's Q* was positively related to the property Family. The author concluded that in family companies there is a greater engagement in obtaining better performances.

Erbetta *et al*. (2013) also obtained a positive relationship between the family property and the performance of its companies. Ayranci (2014) developed a research using in his sample family and non-family companies, highlighting that the influence of the family on the business should be considered through the analysis of the performance of these organizations. Reyna and Encalada (2016) analyzed the effect of succession on economic and financial performance, scoring that, in a process of change from the second to the third generation family, there is a positive effect on the indicator in question.

Before the mentioned contexts, it is noted that family management can trigger positive effects on the performance of family businesses, which stimulates the development of this research in the Brazilian scenario of publicly traded companies. Moreover, the relevance of the papers presented is evident, since they reveal the differential of family businesses in their performance. Thus, according to Beuren *et al*. (2016), the different perspectives of the families, with regard to investments in companies, result in the performance of their companies, distinguishing them from the others for their particularities that, consequently, present reflections on performance. Subsequently, the procedures adopted for conducting this research are presented.

3 METHODOLOGICAL PROCEDURES

In order check the effect of family management in the performance of Brazilian companies, this research is characterized as descriptive; for procedures such as document and; when it comes to addressing the problem, as quantitative as this study used statistical methods to highlight the results.

3.1 Population and Sample

The study population consisted of 100 Brazilian family and non-family companies listed in B3, classified in the cyclical consumption sector. For this purpose, the sample consisted of 34 family and other non-family companies, with a view to comparing the results.

The cyclical consumption sector was chosen because it has the highest percentage of companies characterized as family members (Beuren *et al*., 2013). In addition, this sample has relevance in the Brazilian scenario, as it contributes to about 50% of GDP and 85% of the jobs generated (Family Firm Institute, 2015), generating a significant economic impact (Speckbacher & Wentges, 2012). Thus, they are integral parts of the basis of economic growth and development measured in the country, being extremely important for the economic, social and cultural spheres (Acquaah, 2013). It was also decided to analyze family companies listed on stock exchanges, because according to Vieira (2014), over the decades, several studies have shown that family companies are present among publicly traded companies worldwide.

Also according to Vieira (2014), a difficulty in this type of study is the definition of family and non-family businesses. For this research, this identification was made through the reference form available on the website of the Securities and Exchange Commission (SEC), in Item 15.1/2, for family participation in the capital, and in items 12.6/8 and 12.9, for family participation in Company. Thus, it was defined as relatives the companies that presented the concentration of ownership with a family and/or the participation of family members on the Board of Directors (Shyu, 2011; Politelo *et al*., 2014).

Besides that, to determine the company as a family member, a percentage of minimum stock concentration of 10% was used (Anderson & Reeb, 2003; Shyu, 2011; Politelo et al., 2014). However, there are different combinations of possible family ownership and/or management, considering the complexity of organizations (Frezatti, Bido, Mucci, & Beck, 2017). According to Chua *et al*. (1999), these combinations are three: property and family management; non-family property and family management; Family property and non-family management.

3.2 Collection and Data Analysis

The collection of information was given in the *Economática*® database, in the reference forms disclosed on the website of B3 or in the company's own websites, annually, in the period between the years 2012 to 2016 The specificity of the sampling period results from the availability of data. According to previous studies revisited in this study, three dependent and three independent variables were used to explain the performance of family and non-family businesses, which are presented in table 1.

Table 1
Variable of the search

Classification	Variable	Mensuration	Authors (Year)
Dependents	*Q of Tobin* (QT)*	$\frac{\text{VMA} + \text{D}}{\text{Ativo Total}}$	Anderson and Reeb (2003); Martínez *et al*. (2007); Amran and Ahmad (2009); Shyu (2011); Erbetta et al. (2013); Hamberg *et al*. (2013); Pukthuanthong et al. (2013); Muttakin *et al*. (2014); Vieira (2014); Beuren, Politelo and Martins (2016); Poletti-Hughes and Williams (2017).
	Return on Total Assets (ROA)	$\frac{\text{Lucro Operacional}}{\text{Ativo Total}}$	Anderson and Reeb (2003); Martínez *et al*. (2007); Amran and Ahmad (2009); Bonilla *et al*. (2010); Shyu (2011); Dickinson (2011); Pukthuanthong et al. (2013); Muttakin *et al*. (2014); Vieira (2014); Halili et al. (2015); Beuren et al. (2016); Saleh *et al*. (2017).
	Return over Equity (ROE)	$\frac{\text{Lucro Líquido}}{\text{Patrimônio Líquido}}$	Martínez et al. (2007); Bonilla et al. (2010); Vieira (2014); Halili et al. (2015); Saleh *et al*. (2017); Costa *et al*. (2017).
Independents	Family business (FB)	*Dummy*: (Assigned 1 for family business and 0 for non-family company)	Anderson and Reeb (2003); Amran and Ahmad (2009); Ayranci (2014); Speckbacher and Wentges (2012); Hamberg et al. (2013); Pukthuanthong *et al*. (2013); Politelo et al. (2014); Muttakin *et al*. (2014); Vieira (2014); Halili *et al*. (2015); Hiebl *et al* (2015); Beuren *et al*. (2016); Kang; Kim (2016); Poletti-Hughes and Williams (2017); Saleh *et al*. (2017).
	Life Cycle (LC)	As Table 2 assigned: (1) Birthdate; (2) Growth; (3) Maturity; (4) Turbulence; (5) Decline.	Dickinson (2011); Costa *et al*. (2017); Frezatti *et al*. (2017).
	Variable of Control		
	Size (TAM)	Log (Total Assets)	Anderson and Reeb (2003); Martínez *et al*. (2007); Amran and Ahmad (2009); Bonilla *et al*. (2010); Shyu (2011); Speckbacher and Wentges (2012); Hamberg *et al*. (2013); Halili *et al*. (2015); Hiebl *et al*. (2015); Beuren *et al*. (2016); Kang and Kim (2016); Poletti-Hughes and Williams (2017); Costa *et al*. (2017).

Note. Caption: * VMA = V the public market value (obtained by multiplying the number of outstanding shares by its counted price on the stock exchange); D = VCPC – VCAC + VCE + VCDLP (VCPC: Book value of the company's circulating liabilities; VCAC: Book value of the company's circulating assets; VCE: Book Value of Stocks; VCDLP: Book value of long-term debts).
Source: Own elaboration (2018).

In this research we considered accounting measures (ROA and ROE) and market (*Tobin's Q*) as *proxies* to check for differences in the performance of companies, that is, the family and unfamiliar effect in this indicator.

One of the differentials of this study is the use of the explanatory variable life cycle, because the stage in which the company is reflected in its performance. Therefore, the variable in question was categorized according to the definitions developed by Dickinson (2011), which are presented in table 2.

Table 2
Life Cycle Stage as Dickinson Model (2011)

Phases	Date of Birth	Industrial	Maturity	Turbulence	decay
Operational Cash Flow	Companies enter the market with a deficit of knowledge about revenues and costs.	Profit margins are maximized during the period of increased investment.	The efficiency maximized by increasing operational knowledge.	The decline in growth leads to falling prices. Established routines prevent flexibility.	The decline in growth leads to falling prices.
	Cash flow (-)	Cash flow (+)	Cash flow (+)	Cash flow (+/-)	Cash flow (-)
Investment Cash Flow	Managerial optimism boosts investment.	Companies make large investments in advance to prevent entry.	Obsolescence increases with respect to the new investment.	Empty in theory.	Liquidation of assets to pay off debts.
	Cash flow (-)	Cash flow (-)	Cash flow (-)	Cash flow (+/-)	Cash flow (+)
Financing Cash Flow	Growing company's access bank debt, that is, they increase debt.	Growing companies access bank debt, increase debt.	Change of focus for acquiring financing and distributing excess dividends to shareholders, so that companies decrease debt.	Empty in theory.	Focus on refunds and/or debt negotiation.
	Cash flow (+)	Cash flow (+)	Cash flow (-)	Cash flow (+/-)	Cash flow (+/-)

Source: Adapted from Dickinson, V. Cash flow patterns as a proxy for firm life cycle. *The Accounting Review*, *86*(6),1969-1994. (2011)

To identify the stage of the life cycle of the companies, this research was based on the study by Dickinson (2011), which demonstrated how the combinations of cash flows related to the company's operations, its investments and financing can be used to classify the life cycle stage of organizations, and how these phases explain the profitability of companies. In this sense, we opted for the identification model proposed by the author to align itself with the purposes of this study.

The stage of birth of the company was classified as number 1; growth with the number 2; maturity, number 3; subsequently, when the company presents itself in turbulence, it was classified as number 4 and, finally, the number 5 was destined for companies in decline. For this, according to table 2, the identification of the phases of the life cycle of the companies was made by vertical analysis. In other words, the company was classified in the birth phase when it presented, in the years analyzed, cash flows and negative investment and financing, positive. For the growth phase, the company has positive cash flows for operational, negative for investment and positive for financing.

In the maturity phase, the cash flow presents positive values for operational and negative for investment and financing. The turbulence phase is identified by the three positive or negative cash flows. Finally, the decline phase can be identified by means of the negative cash flow to operational, positive for investment, and positive or negative for financing.

For data analysis, Multiple Linear Regression was performed through the *software* SPSS®. This method was chosen because, according to Wooldridge (2012), it allows analyzing a time series for each cross-sectional of the data set and starts to eliminate the effects of variables that were excluded from the study of variations in the variable Dependent over the years analyzed. This method also offers the possibility of studying the relationship between one or more explanatory variables (Fávero, 2015). The regression model of this search is defined as follows:

$$Desempenho = \beta_0 + \beta_1 \text{ Family Business} + \beta_2 \text{ CV1} + \beta 3 \text{ CV2} + \beta 4 \text{ CV3} + \beta 5 \text{ CV4} + \beta 6 \text{ CV5} + \beta_7 \text{ Size} + \varepsilon$$

It is noteworthy that initially it was considered as the dependent variable (performance) in the *Tobin's Q* model, subsequently the ROA and, finally, the ROE. Subsequently, the data analysis and the results obtained for the Brazilian family and non-family companies approached in this study are presented.

4 DESCRIPTIONS AND ANALYSIS OF DATA

According to the procedures listed in the methodology, a descriptive analysis of the companies belonging to the sample was carried out. Further, the correlation matrix is presented to evidence the relationship between dependent and independent variables. Finally, a regression analysis was conducted to observe whether there is an effect of family management on the performance of the companies studied. Firstly, family and non-family businesses were analyzed together (dichotomous variable).

Table 3 shows the descriptive statistics of the dependent and independent variables. It is emphasized that the variables family company (EF) and life cycle (CV) for descriptive statistics were not considered, since they are dichotomous variables.

Table 3
Descriptive statistics of variables

Variable	Minimum	Maximum	Average	Standard deviation
QT	3.006	8.472	5.856	0.814
ROA	0.000	0.814	0.083	0.095
ROE	0.000	2.835	0.472	2.134
SIZE	10.250	17.530	14.143	1.492

Source: Research data.

Table 3 shows that the sample is composed of a group of heterogeneous companies, although they are classified in the same sector. It appears that there are companies with favorable performances, and in counterpoint, there are companies with low performance. In general, both family and non-family businesses have comparable performance, although the return on equity variable presents maximum and average values that indicate the presence of some companies with better ROE than others. Thus, the characteristics of the sample reveal companies with high and low accounting and market performance, profitability, as well as size.

Before analyzing the effect of family management on the performance evaluation of Brazilian public companies belonging to the cyclical consumption sector listed in B3 by means of Multiple Linear Regression, the normality tests and the correlation of *Spearman* among the variables to identify potential multicollinearity problems, as shown in tables 4 and 5.

Table 4
Normality Test

Variable	*Kolmogorov-Smirnov*			*Shapiro-Wilk*		
	Statistics	Federal district	Sig.	Statistics	Federal district	Sig.
QT	0.167	344	0.000	0.797	344	0.000
EF	0.418	344	0.000	0.135	344	0.000
ROA	0.209	344	0.000	0.639	344	0.000
ROE	0.068	344	0.001	0.976	344	0.000
BV	0.252	344	0.000	0.890	344	0.000
SIZE	0.344	344	0.000	0.636	344	0.000

Source: Source of the search (2018).

The data presented in table 4 are not normal, since the *Kolmogorov-Smirnov* and *Shapiro-Wilk* tests showed significance at the level of 5%, indicating their distribution out of the pattern. Then he performed the correlation *Spearman* to identify the intensity and relationship between the variables and possible multicollinearity problems (Fávero, Belfiore, Chan & Silva, 2009). This test does not only suggest a cause and effect relationship, but also an association between the variables studied. According to Gujarati and Porter (2006), the presence of multicollinearity in the data does not mean that the model presents problems, however, when elevated in relation to the variables, this consequently increases the error. Table 5 shows the results of *Spearman*'s correlation between the variables analyzed in the research.

Table 5
Correlation of *Spearman* between variables

Variables	ROA	ROE	QT	SIZE	BV	EF
ROA	1	0.585	-0.234	0.229	0.002**	0.150
ROE		1	0.010	0.055**	0.022**	0.038**
QT			1	-0.845	0.175	0.039
SIZE				1	-0.077	-0.124
BV					1	0.021**
EF						1

Note. Caption: * Correlation is significant at the 1% ** Correlation is significant at the 5 %
Source: Source of the search (2018).

According to the data presented in table 5, the existence of a relationship between the dependent and the independent variables is noted. Thus, there is no high degree of correlation between the explanatory variables (correlation higher than 85%), which reveals that there are no multicollinearity problems that affect the results of the regression model with the variables used. Thus, all explanatory variables illustrate the effect of family management on the performance of Brazilian public companies listed in the B3 belonging to the cyclical consumption sector.

These results reveal that family involvement is related to the other variables of the study, although this is better explained by the analysis of Multiple Linear Regression, which using the *Tobin's Q* as the dependent variable, and in the sequence, the ROA and the ROE , resulted in three models, presented in table 6.

Table 6
Results of Linear Regression model

Variable		*Q of Tobin*	ROA	ROE
Constant	Coefficient	-5.80	3.37	-0.32
	Sig.	0.00	0.00	0.75
Family business	Coefficient	-0.01	3.33	-0.88
	Sig.	0.996	0.00	0.38
Date of Birth	Coefficient	-2.37	-3.12	-1.82
	Sig.	0.02	0.00	0.07**
Industrial	Coefficient	-1.88	-0.41	-0.08
	Sig.	0.06**	0.68	0.94
Turbulence	Coefficient	-0.26	-1.33	-0.08
	Sig.	0.79	0.19	0.93
Decay	Coefficient	-0.73	-1.60	-0.21
	Sig.	0.47	0.11	0.83
Size	Coefficient	-3.25	5.72	-0.07
	Sig.	0.00	0.00	0.95
R^2		0.39	0.41	0.12
R^2 Adjusted		0.15	0.17	0.01
Durbin-Watson		1.02	1.93	2.06
ANAL VARIANCE		0.00	0.00	0.79

Note. Caption: *Significance at the 5% level. **Significance at the 10% level.
Source: Source of the search (2018).

Table 6 shows, from the analyzed models, that the set of independent variables explains 39% of the market value of the companies analyzed, 41% of the return on assets and 12% of the return on equity, that is, the economic and financial performance. The low capacity to explain the model regarding family and non-family businesses and their performance was also found in previous studies (Martínez et al., 2007; Bonilla et al., 2010; Din & Javid, 2011; Shyu, 2011; Ayranci, 2014; Reyna & Encalada, 2016).

We used *Tobin's Q*, ROA and ROE as *proxy* to measure the performance, which presented the variable family business as positive and significantly related to *Tobin’s Q* and ROA. This finding supports the finding of Amran and Ahmad (2009), in which *Tobin’s Q* is a measure that best explains the company's performance, as it reflects market performance rather than accounting. Another explanation for the *Tobin’s Q*, in other words, the book value of the assets minus the book value of equity plus the market value of the equity, all divided by the book value of the assets, have excelled in this analysis is based on Hamberg et al. (2013) and Pukthuanthong *et al*. (2013), which argue about *Tobin's Q* being a future-oriented measure, which aims to reflect the market valuation of companies' assets in relation to the book value and future growth opportunities of the company. ROA and ROE, on the other hand, are considered profitability and productivity measures. Thus, these results revealed that family and non-family businesses have differences in their performance and market value Poletti-Hughes and Williams (2017) corroborate this assertion by showing that family businesses outweigh non-Family in terms of value (market performance).

Vieira (2014) analyzed as *proxies* for performance the Tobin’s Q, ROA and ROE, noting also that one of the explanatory models for the relationship between the independent variables (family business) and the performance of the companies is the dependent variable *Tobin’s Q*. Besides that, the authors found positive results for the ROA, as well as this research. The results of Shyu (2011), Hamberg *et al*. (2013), Muttakin *et al.* (2014), Beuren et al. (2016) and Poletti-Hughes and Williams (2017) also revealed that the family business influences the market performance, from the *Tobin’s Q*, as evidenced in this research. In the study by Vieira (2014), the *proxy* for ROE performance also presented lower value of R^2, suggesting that this variable is not appropriate to measure the performance of the company.

Another variable that deserves prominence is the size of companies, since it was related to market performances (*Tobin’s O*) and economic-financial (ROA). These findings indicate that the size of the company influences the market and economic-financial performance of the company, according to Martínez et al., (2007), Bonilla et al. (2010), Shyu (2011) and Hiebl *et al*. (2015). Saleh *et al*. (2017) also found a significant relationship between the size of the company and the performance of this measured by the ROE, corroborating with the findings of this study with family businesses, although these are inconsistent with those of Anderson and Reeb (2003), which indicate the variable size as non-determinant of a company's performance.

On the other hand, in this joint analysis of family and non-family businesses, the stages of the life cycle of birth and growth were related to the *proxies* of performance, although the other phases (maturity, turbulence and decline) did not have presented relations. These results do not corroborate the inferences of Dickinson (2011) and Costa *et al*. (2017), since they discuss that the experience and expertise acquired throughout the life cycle phases help to better decision-making, consequently improving performance.

Overall, the evidence found does not provide sufficient results for the other performance *proxies* (ROE), indicating that the evidence related to the performance of the family business is sensitive to the different performance settings, as approached by Vieira (2014).

In a comprehensive way, it is noted that family businesses differ from other companies mainly in terms of their value. According to Shyu (2011), compared to other shareholders, members of a family have more internal information and can predict the prospects of the company more easily. This allows them to make more precise decisions about reducing or increasing their properties, which affects the company's performance (Pukthuanthong et al., 2013). In addition, families can better know the market, as well as the company, due to its long-term presence in this (Pukthuanthong et al., 2013), thus guaranteeing a more effective monitoring and encouraging the increase of the family's wealth, consequently the Company's performance (Muttakin et al., 2014).

Therefore, as a consequence of the inherent particularities of family businesses, several arguments are presented to determine their performance, thus detecting divergences in the literature. These conflicting results are products of the different concepts of family business, as well as the use of different indicators to assess organizational performance, a statement corroborated by the results of this study. Thus, it is suggested that the classification of the family businesses used in this study may be the reason for the non-significance in relation to the variable of *Tobin's Q* and, at the same time, significance with, for example, the variable ROA. According to the family businesses literature revisited, no studies were found that would support the reason why our results between the ROA, ROE and *Tobin's Q* performance measures diverged.

5 CONCLUSIONS

This study aimed to verify the effect of family management on the performance evaluation of 100 Brazilian public companies belonging to the cyclical consumption sector listed in B3. For this purpose, a descriptive, documental and quantitative approach was carried out using multiple Linear Regression, which comprised the years 2012 to 2016. The results were analyzed by means of statistical tests such as: normality test; *Spearman*'s correlation to verify the intensity and direction of the correlations between the variables; and multiple Linear Regression, to verify the significance of the models.

The findings revealed that family and non-family businesses differ in their value, that is, in the accounting performance measured by the ROA *proxy*, since the variable "family businesses" was significantly and positively related to the performance measure. Thus, in the use of the ROA, family management positively influenced the company's performance, differently from what occurred for the accounting performance measured by ROE and market performance by *Tobin's Q*, since these variables did not present relationship with family businesses. Another prominent variable in the analyzed model was the size of the company, which influences the performance of the analyzed sample. To this end, the size of the company implies greater efficiency in the use of assets by the family businesses of the cyclical sector, which denotes a positive relationship with the market and accounting performances.

These results allow us to infer why family businesses are one of the most important models of business development in Brazil and other countries, in addition to showing a relationship in the performance of family and non-family businesses. Thus, an increase in family ownership can trigger an increase in market performance, which indicates that the family has a stronger incentive to maximize the company's performance, for its wealth to be linked to it.

It is inferred therefore that is in family businesses greater engagement with the aim of obtaining better performance accounting. These valorize the maximization of the company's value in the long term, which was also proven by previous studies (Bonilla et al., 2010; Shyu, 2011; Hiebl *et al*., 2015). Following Shyu (2011), Ayranci (2014) and Reyna and Encalada (2016), these findings demonstrate that there are differences in performance between family and non-family businesses.

This study contributes scientifically to corporate finances, both by identifying the performance elements of the commonly used companies, as well as by aggregating the existing literature with the reality of Brazilian family organizations of the cyclical consumption sector. In addition, this research can contribute socially by collaborating with the capital market in the market evaluation of the companies listed in the cyclical consumption sector in the stock exchange. In addition, this study provides an overview of different *proxies* that can be adopted by family businesses for performance evaluation, with a view to seeking a differential in the capital market, since the financial health of companies can attract investors. The contribution of this research can also be identified in relation to the greater efficiency of managers regarding accounting performance, since the companies of this research showed differences in market performance measured by the ROA *proxy*.

This work, despite its contributions on the effect of family management in assessing the performance of companies in the cyclical consumption sector, has limitations. The first consists in the use of only one sector of B3, making it impossible to generalize the results to other sectors. In second place, the analysis of only Brazilian companies precludes the comparability of results with other countries. Another limitation concerning model researched, since other variables of market performance, economic-financial and other determinants of family and non-family businesses could have been used. Also, other factors such as contingent variables and organizational culture, together with the family business context, can affect an organization's performance.

It is suggested for future investigations the increase of the sample, both for other economic sectors of the stock exchange and for other countries, in order to obtain a broader picture of the reality of Brazilian family businesses and enable the comparability of results, as well as its generalization to similar economies. It is also recommended to replicate this study in other countries to consolidate the literature on family businesses. Because family influence is a relevant theme that awakens the interest of academia, the analysis of its impact on financial business becomes necessary through other variables. It is also suggested to consider the succession process and the migration of family management to the professional. Therefore, further research with deeper approaches on the subject is essential.

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FACTORS OF ANTICIPATORY SOCIALIZATION: A STUDY WITH STUDENTS OF ACCOUNTING SCIENCES

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ABSTRACT

Motivation, environmental perception, involvement and professional commitment are characterized as sociable elements of an individual. In this context, this study investigates the factors of anticipatory socialization of university students of accounting from two federal universities in the state of Paraná under the conceptual and methodological support of the Astin model. The data were collected through a questionnaire adapted from the study of Ahmad, Anantharaman and Ismail (2012), applied to 71 graduating students in the year 2016, and were treated with the statistical techniques of descriptive analysis and Structural Equation Modeling

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via Partial Least Square (PLS). The research findings suggest that the motivation and environmental perception factors do not affect in a statistically significant way on the involvement and, consequently, the professional commitment. However, it was confirmed that the motivation positively and significantly affects the professional commitment. Thus, these results instigate future research to include other cognitive characteristics of students that may influence them in the face of professional commitment.

Keywords: Motivation. Perception of Environment. Involvement. Professional Commitment.

1 INTRODUCTION

The integrity of the accounting profession and the credibility of the financial information provided by companies have been damaged by scandals, which derive largely from ethically questionable accounting and accounting practitioners (Low, Davey & Hooper, 2008). For Everett and Tremblay (2014), the dissemination of these corporate scandals instigates believing that the accountants have lost sight of their moral orientation, compromising the prestige of the profession.

The result of the work of accounting professionals is extremely important for various types of users, such as shareholders, creditors, employees, suppliers, government, besides the profession and society in general; and therefore they must pay attention to their professional responsibility (Mahdavikhou & Khotanlou, 2012). For Borges and Medeiros (2007), accounting professionals must possess elements capable of placing them in a differentiated position in relation to their peers, through their technical capacity, ethical posture and professional and social commitment.

The professional's commitment, in general, is a crucial element in the organizational context, whose success in achieving the goals depends largely on the strategies created by the organization to involve the worker, ensuring the sharing of Values, objectives and policies that guarantee equitable exchanges between the parties (Bastos & Andrade, 2002). In view of this, the professional commitment of the accountant becomes essential to be studied, since it is not known how the individual is in fact committed to the duties of the profession and what the factors that influence their attitudes are.

Research on commitment, despite being widely investigated in the organizational field (Borges & Medeiros, 2007), still needs further studies in other contexts. Investigating, understanding and understanding the roots of professional commitment are of great importance, especially to identify factors that may require intervention during the process of forming a professional. Barros (2011) argues that the school is one of the most important agents of the anticipatory socialization of individuals. It plays a decisive role in promoting attitudes and behaviors, which are fundamental to a future adaptation in the professional world. Following this line, for Ahmad *et al.* (2012), the existence of professional commitment results from specific socialization. It happens at the level of undergraduate education or an anticipatory phase. Thus, according to the authors, before the individual enters the labor market, the acquisition of values, attitudes are molded and cognitive abilities are developed.

In higher education institutions (HEI), little attention is given to the acquisition of values, behaviors and attitudes, necessary for the student to assume his/her professional role (Shinyashiki, Mendes, Trevizan, & Day, 2006). The professional socialization begins in the academic context. It extends further to the work environment. On this, Baccaro (2007) points out that the development of the students should be the focus of the HEI, considering the internalization of the norms and values of the profession, because, when they get into the labor market, the way they were socialized will be a differential.

Given this context, it is the purpose of this study to contribute to the improvement of the formation of the professional commitment understanding that occurs in the phase of anticipatory socialization, developed in the course of undergraduate for bachelor in Accounting. Therefore, the guiding question of this investigation is: what factors, during the undergraduate course in accounting, influence the construction of the professional commitment of students with the accounting profession?

In this perspective, this research follows the same line of the study by Ahmad *et al.* (2012), which adapted the model of the entry-environment-output (EAR) of Astin (1993), originally developed with the purpose of identifying factors of significant influence of the professional commitment. It seeks to contribute, with this study, in a relevant way to the formation of a more robust literature base on the experiences experienced by students in the undergraduate period that tend to influence the formation of professional commitment, since in Brazil researches this theme, focusing on the area of teaching and professional practice, are still incipient. Another important factor is the contribution to the HEI, since it can provide evaluation subsidies for items that can be considered as more important in the academic training process. The research points out the factors that contribute most to the formation of the students of accounting professional commitment.

2 THEORETICAL FRAMEWORK AND RESEARCH HYPOTHESIS

This topic will be addressed studies on the professional commitment in Accounting, the definition and anticipatory socialization concepts of Accounting students as well as the Astin theory and research hypotheses.

2.1 Professional commitment to Accounting

The professional commitment, according to Setyadi (2008), relates the nature of the individual to his profession, and includes belief, acceptance of goals and professional values. In this topic, in the accounting area, the professional commitment is significant for the professionals, as it leads to a greater sensitivity to ethical issues and increases the involvement of the work. It determines not only the professional's fidelity to the practice of the profession, but also the adherence to professional codes of conduct (Ahmad et al., 2012). The importance of these factors is also emphasized by Mahdavikhou and Khotanlou (2012), who affirm that the existence of norms and rules by them does not guarantee true information. Professionals without responsibilities and moral values can provide manipulated financial reports.

The question of the professional's commitment to the accounting profession has been considerably addressed in recent years, due to the crises of trust caused by many ethical failures (Elias, 2007). The integrity of the accounting profession and the credibility of the financial information provided by companies have been damaged by scandals, which derive largely from ethical questionable accounting and practitioners (Low, Davey & Hooper, 2008). For Everett and Tremblay (2014), the dissemination of these corporate scandals instigates to believe that the professionals have lost sight of their moral orientation.

In this perspective, the lack of morality in accounting practices is a factor that can bring invaluable consequences, since accounting works with the company's assets. The result of the work of accounting professionals is extremely important for various types of users, such as shareholders, creditors, employees, suppliers, government, besides the profession and society in general; and therefore they must pay attention to their professional responsibility (Mahdavikhou & Khotanlou, 2012). Thus, these professionals must possess elements capable of placing them in a differentiated position in relation to their peers. They must use their technical capacity, their ethical posture and their professional and social commitment (Borges & Medeiros, 2007).

The importance of the ethical behavior and the personal integrity of an individual, for the profession and for the nation, should be emphasized in the education of the academics and also of the accounting professionals that were already trained (Smith, 2003). For Mastracchio (2005), education in accounting must teach methods to measure the consequences of decisions taken by accountants. In the same direction, Elias (2007) points out that education for professional commitment in accounting should begin in the classroom, emphasizing the importance of financial reports for users, as well as their own profession. Thus, it is observed that these and other behaviors should be directed towards a greater professional commitment to the area and emphasized in all stages of a professional, especially in the socialization with the profession.

2.2 Anticipatory socialization of accounting students

Professional socialization can be understood as the process through which the student acquires a feeling of professional identity and develops knowledge, skills and commitment to the profession (Waugaman & Lohrer, 2000). This process of socialization occurs according to events, professional reunions, or needs and desires of individuals. The values of the groups with which it relates can be included in this context. In this way, Dubar (2005) argues that socialization is not only the transmission of values, rules and norms, but also causes the individual to develop a representation of a particular environment or area of specialization.

The process of professional socialization is developed in three phases, according to Ardts, Janse and Van Der Velde (2001): (i) the anticipatory phase, which occurs during higher education; (ii) phase of the first referral for the exercise of professional activities and (iii) phase of the acquisition of experience after several years of professional work. Regarding the first phase, the anticipatory socialization, Pitney (2002) defines it as the process or stage by which individuals learn how to internalize unique professional traits for the chosen profession. In the accounting profession, the focus of this study, the socialization process occurs in the anticipatory phase. It is a continuous process, which occurs during the period of the higher course in accounting course.

The formation of undergraduates is a complex process. It is when individuals pass the level of students to professionals. In this way, Baccaro and Shinyashiki (2011) say that they are prepared on an advanced educational level to take responsibility for the practice of a career characterized by a high level of autonomy, within the scope of a specialty particular intellectual property. The expectations about professional practice lead to normative education, with values, ethics, personal and professional commitment. Lean individuals to a service orientation and development of knowledge and skills (Weidman, Twale & Stein, 2001).

The anticipatory socialization, even with origin during the higher course, extends to the entire professional life of the individual. Therefore, the HEI should focus on the development of its students and consider the internalization of the norms and values of the career, because when they enter the labor market, the way they were socialized will be a differential (Baccaro, 2007). Following this line, for Ahmad *et al.* (2012), the HEI should ensure that the teaching environment is conducive to learning activities and student involvement, encouraging and starting it correctly in the professional career.

In the Brazilian accounting context, research under anticipatory socialization is incipient. However, in the international context, several studies indicate positive effects on the anticipatory socialization of accounting students in various subjects, such as the environment, ethics and characteristics of the students (Elias, 2006, 2007, 2008; Saat, Porter & Woodbine, 2012; Farag, 2016). Ahmad *et al.* (2012) argued that higher levels of anticipatory socialization (understood in motivation, perception of the environment and involvement of accounting students) resulted in higher levels of professional commitment.

2.3 Astin Model

This study investigates which factors, in the undergraduate course in accounting, influence the construction of the professional commitment. It is based on the theory of student involvement and the Astin model, structured based on three fundamental elements:(i) entry, (ii) environment and (iii) leave from higher education students.

The experiences experienced by students in the undergraduate period are explained by the impact models of the university. For Pascarella and Terenzini (2005), these models attribute the cognitive and affective changes that occur in the student during their academic training to factors such as the characteristics of the institutional environment, characteristics and experiences of the student and the relationship between teacher and student. For Murray (2006), these models explain not only the way students benefit from their training, but also how the HEI is prepared to provide these benefits. According to the author, the most cited model in this area is Astin's EAR (1993).

Astin’s Studies (1993) contribute to the development of the area of higher education. They emphasize the understanding of how the changes and the development of the students occur during the training process and what can be done to increase this development (Schleich, 2006). The EAR model, according Ahmad *et al.* (2012), is applicable in almost any field of the social sciences and has been used in several studies. This model is premised that educational assessments are not complete, unless they include information about the inputs, the educational environment and the results of the students (Astin, 1993).

The factors that compose the model are the fundamental concepts of the theoretical model of Astin's student Involvement (1984), which describes the importance of students ' involvement in the university. The (i) entries are the demographic data, the training and any previous experiences of the student; (ii) The environment is responsible for all the experiences experienced by the student during the course and (iii) the results cover characteristics, knowledge, attitudes, beliefs and values that remain after the student forms.

In this direction, the Astin model is considered appropriate to explain the professional commitment, since it integrates important elements within the teaching of accounting. The entries refer to the characteristics with which the students enter the undergraduate course in accounting sciences, and directly influence the environment and the results. The environment is related to the students ' experiences during the course. The results are the knowledge, academic achievements, values and behaviors acquired during the training (Ahmad *et al*. , 2012). .

Moreover, this model evidences the need to have an understanding of the qualities of the students and the characteristics they present at their entrance to a teaching institution, the context of the educational environments with which they come into contact and the measure of the evolution of the knowledge and values acquired during the academic period. The students ' input variables are the characteristics with which they begin graduation (Astin 1993), and one of them is the motivation that determines how students work in relation to their goals (Ahmad *et al*., 2012). For Santos (2013), the commitment to university education is dependent on the individual motivation and academic skills of the student.

In this context, to know how motivation acts on professional commitment it is necessary to identify which factors are directly associated with it and whether they are of external or internal origin to the individual. In the Astin Model (1993), motivation is directly related to the environment, which is corroborated by Murray (2006), when he affirms that motivation is a byproduct of the interaction with the environment. Therefore, in relation to the motivation construct, the following hypotheses are proposed for this research:

H_1: The motivation of the students has a positive relationship with the perception of the environment.

H_2: The students’ motivation has positive relationship with the professional.

In the same way as motivation, environmental perception is a variable that indirectly affects professional commitment. For Murray (2006), since the HEI is responsible for creating an environment conducive to learning, the counterpart of students is the responsibility for the investment of time and effort, aiming at their own education. Santos (2013) points out that the student's involvement, understood in his own interaction and effort with the university's social and academic systems, occurs over time. In this same line, Schleich (2006) evidenced the importance of the student's role in exchanging ideas about the institutional environment, which represent changes that depend on the students ' involvement with the resources offered by the institution. Based on this context, the third research hypothesis is elaborated:

H_3: The perceived environment has a positive relationship with the student's involvement.

The construct of involvement is the central point of the Astin Model (1984). According to the author, the most involved students dedicate themselves to conducting their studies. They employ a considerable amount of time in the university context, actively participate in student tasks and interact with employees and professors from the academic institution to which they belong. Thus, the construct of student involvement in certain aspects resembles a more common construction in psychology: Motivation (Astin, 1984). Therefore, the following research hypotheses are established:

H_4: Student motivation has a positive relationship with the student's involvement with the profession

H_5: The student's involvement acts as a mediating variable in the influence of motivation on professional commitment.

Given these considerations, the theoretical model integrates four relevant elements of the model of Astin's Involvement (1993), namely: Student motivation, perception of environment, involvement and professional commitment, as shown in Figure 1.

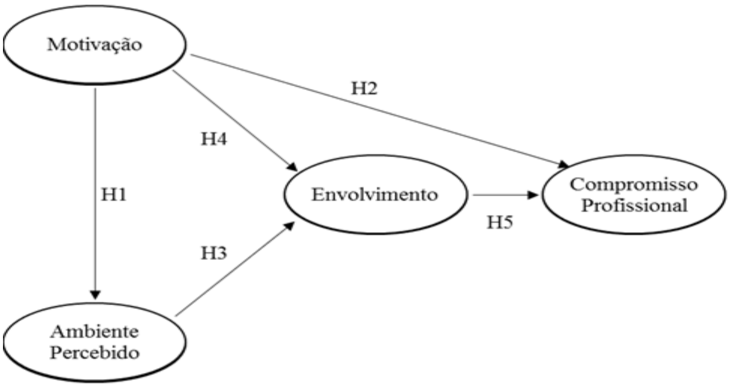

Figure 1. Theoretical model and hypotheses of the research
Source: Ahmad, Z., Anantharaman, R. N., & Ismail, H. (2012). Student´s motivation, perceived environment and professional commitment: An application of Astin´s College Impact Model. *Accounting Education, 21*(2), 187-208.

The results are the knowledge, academic achievements, values and behaviors acquired during training (Ahmad *et al.*, 2012).

3 METHODOLOGY

The population investigated in this study consists of 165 students regularly enrolled in the undergraduate courses in accounting and graduates in the year 2016, in two federal institutions of higher education in the state of Paraná. To calculate the minimum sample number, the software *G*Power* was used, in line with the parameters suggested by Ringle, Silva and Bido (2014), for use in structural equation modeling. The software *G*Power* allows the calculation of the minimum a priori sample, based on the latent variable with the highest number of predictors (Ringle *et al*., 2014). For this study, considering the constructs present, the minimum calculated sample was 63 respondents. The final sample consisted of 71 students.

The research instrument used to collect the data in this study was translated and adapted from Ahmad *et al*. (2012). The original questionnaire is composed of 69 assertives, of which five were excluded because they were not applicable to the Brazilian context. Thus, the final version consisted of 64 assertives on a seven-point *Likert* scale. The Back-translation process (Cooper & Schindler, 2003) was used in the preparation of the instrument applied to the potential respondent. After the translation and adaptation, a pre-test was performed with six students from a stricto-sensu postgraduate program and with four professors from a federal university, with the purpose of verifying the comprehensibility of the content and performing the possible adjustments. Table 1 summarizes the composition of the questionnaire, by constructs, variables and their respective amounts of assertives.

Table 1
Research Constructs and Variables

Constructs	Variables	Assertive
Motivation (MTV)	• External Motivation (MTVE); • Internal Motivation (MTVI);	1 to 9 Building A
Perception of Environment (P.A.)	• Students (PA.ALU); • Building (PA.PRD); • Professor (PA.Prof); • University (PA.UNV)	1 to 20 Building B

Student Engagement (ENV)	• Interaction with professors (ENV.I); • Self-effort (ENV.P)	1 to 20 Building C
Professional Commitment (CPROF)	• Professional Commitment (CPROF)	1 to 15 Building D

Source: Adapted of Ahmad, Z., Anantharaman, R. N., & Ismail, H. (2012). Student's motivation, perceived environment and professional commitment: An application of Astin's College Impact Model. *Accounting Education, 21*(2), 187-208.

For data collection, the research instrument was applied in person to the students by one of the authors, in April 2016, in two federal education institutions, both in the state of Paraná.

Data were initially treated with descriptive statistics. Subsequently, the Structural Equation Modeling (SEM) technique was used and processed with the *software* SmartPLS. SEM is a linear regression estimation technique based on the decomposition of variable matrices and covariates (Bido, Silva, Souza, & Godoy, 2010). SEM allows to test a set of variables and to investigate the level of explanation of independent variables in relation to dependent variables (multiple regression aspects), and to indicate which exogenous variable is more important (Klem, 2006). In this study, the option for the *Partial least Squares* (PLS) model is due to the sample size (n=71), since it is appropriate when working with small samples (Hair, Black, Babin, Anderson, & Tatham, 2009).

4 RESULTS AND DISCUSSION

This section will present, at first, the profile of respondents, descriptive analysis of data, validity and reliability of the model. Following, the conceptual model and the statistical test, and finally, the analysis and discussion of the results.

4.1 Profile of respondents

The table 2 details the characteristics of the sample, that is, the demographic profile regarding gender, age, institution and marital status of the 71 respondents.

Table 2
Profile of respondents

Gender	N	%	Age	N	%
Female	38	(54%)	From 1970 to 1979	1	(1%)
Male	33	(46%)	From 1980 to 1989	15	(21%)
			From 1990 to 1995	55	(77%)
Institution	**N**	**%**	**Marital status**	**N**	**%**
UFPR	45	(63%)	Married	14	(20%)
UTFPR	26	(37%)	Divorced	2	(3%)
			Single	55	(77%)

Source: source of the search (2016).

As Table 2, of 71 respondents of the survey, 54% are female gender, with a preponderance of age in the range 21 and 26 years. Of the total sample, 45 students study at the Federal University of Paraná (Universidade Federal do Paraná - UFPR), located in Curitiba, and 26 on Federal Technological University of Paraná (Universidade Tecnológica Federal do Paraná), located in Pato Branco. As for the marital status, 55 respondents declare themselves as single. Of the 71 students who were respondent and regularly enrolled as seniors of the year 2016, 18 of them are in their second higher education course. Among the courses completed include: Interior Design, Tourism, Administration, Zootechnics, Languages (Arts), Logistics, Law, Secretariat, Mathematics, Environmental Engineering and Physics. It was not investigated the reason why students are attending a second course, in specific, the undergraduate in accounting.

4.2 Structural model and hypotheses of search

The quality of the model was evaluated by means of composite reliability (CC), *Cronbach's* Alpha, convergent validity and discriminant validity. Reliability is considered appropriate when factorial loads have a *Cronbach's* Alpha and a CC of at least 0.70 (Hair et al., 2009). The convergent validity, in accordance with the arguments of Hair *et al*. (2009), refers to the *Average Variance Extracted* (AVE), which demonstrates the shared variance between the indicators of each latent variable or construct of the model.

The discriminant validity analysis was performed by comparing the square root of the AVE with the correlations between the latent variables (Fornell & Larcker, 1981). This indicator is considered satisfactory when the coefficient obtained from the latent constructs, manifested in its variables, exceeds 0.50 (Fornell & Larcker, 1981).

Finalized these tests, identified the need for exclusion of some indicators: (i) external motivation (MTVE4, 5, 6 MTVE MTVE); (ii) perception of the students' environment (PA. ALU2), University (PA. UNV4); (iii) involvement-interaction with professors (ENV.I1, ENV.I10, ENV.I13, ENV.I14), effort (ENV.P1, ENV.P6) and (iv) professional commitment (CPROF2, CPROF3, CPROF4, CPROF6, CPROF8). Table 3 details the results of AVE, CC, R^2 and *Cronbach*'s Alpha.

Table 3
Internal reliability of constructs and convergent validity

Variables	*AVE*	*Composite Reliability*	*R^2*	*Cronbach's alpha*
PA.ALU	0.7016	0.9037	0.112	0.8574
PA.Prof	0.6649	0.9082	0.253	0.8744
ENV.I	0.5469	0.8252	0.334	0.7303
ENV.P	0.3811	0.8578	0.354	0.8177
MTVE	0.6601	0.8535	–	0.7536
MTVI	0.6685	0.8580	–	0.7521
PA.PDR	0.7752	0.9451	0.208	0.9274
CPROF	0.5645	0.9273	0.433	0.9112
PA.UNV	0.6231	0.8686	0.179	0.7996

Note. Students (PA.ALU); Professor (PA.Prof); Interaction with Professors (ENV.I); Own effort (ENV.P); External Motivation (MTVE); Internal motivation (MTVI); Building (PA.PRD); Commitment Professional (CPROF); University (PA.UNV).
Source: source of the search (2016).

Detailed AVE coefficients in Table 3 meet the parameters indicated in the literature, except for the scale involvement of own efforts. Even after the exclusions of two indicators, identified with low factorial loads (ENV.P1, ENV.P6), we were unable to fully meet convergent validity. However, due to the fact that this dimension composes the construct component involvement of the Astin model, the option was for its permanence. Regarding the reliability of the model, the values for the composite reliability and for the *Cronbach*'s Alpha are greater than 0.70, the minimum recommended. Table 4 details the results of the discriminant validity.

Table 4
Discriminant validity

Variables	PA.ALU	PA.Prof	ENV.I	ENV.P	MTVE	MTVI	PA.PDR	CPROF	PA.UNV
PA.ALU	**0.8376**								
PA.Prof	0.5810	**0.8154**							
ENV.I	0.4281	0.4961	**0.7395**						
ENV.P	0.3485	0.4178	0.4967	**0.6173**					
MTVE	0.1773	0.4419	0.1406	0.4722	**0.8125**				
MTVI	0.3235	0.3592	0.2906	0.3272	0.2910	**0.8176**			
PA.PDR	0.5974	0.6367	0.2987	0.2095	0.2583	0.4342	**0.8805**		
CPROF	0.4763	0.5504	0.4048	0.4181	0.4622	0.5143	0.5355	**0.7513**	
PA.UNV	0.6518	0.7652	0.5033	0.3855	0.3115	0.3647	0.6812	0.4915	**0.7894**

Source: source of the search (2016).

In general, as indicated in the results shown in Table 4, the discriminant validity has been widely met by the square root of the coefficient of AVE (Fornell & Larcker, 1981).

Based on the model Astin (1993) and Ahmad *et al*. (2012), five hypotheses were mentioned, as attempts to answer the research question. The corroboration or not of these research hypotheses were made through the *Bootstrapping* procedure. In each structural path of the *path diagram* of the model, the test to corroborate or not the research hypothesis was to verify whether the values of the *t-value* are greater than 1.96 for a P-value < 0.01 and P-value < 0.05, as recommended by Hair *et al*. (2009). Table 5 details the analysis of the established relations between the investigated constructs.

Table 5
Panel of the relations between the investigated constructs

PANEL A: without mediation						
Hypothesis	**Constructs**	**Structural relation**	**Beta**	**t-value**	**p-value**	**Sig.**
H1	MTV-> PA	MTVE-> PA.ALU	0.0908	0.7685	0.442	n.s
		MTVE-> PA.Prof	0.3686	3.3526	0.001 *	sig
		MTVE-> PA.PRD	0.1442	1.091	0.276	n.s
		MTVE-> PA.UNV	0.2244	1.9572	0.051	n.s
		MTVI-> PA.ALU	0.2971	2.6894	0.007 *	sig
		MTVI-> PA.Prof	0.2519	2.5117	0.012 **	sig
		MTVI-> PA.PRD	0.3922	3.7827	0.000 *	sig
		MTVI-> PA.UNV	0.2994	2.745	0.006 *	sig
H2	MTV-> CPROF	MTVE-> CPROF	0.3102	2.769	0.006 *	sig
		MTVI-> CPROF	0.3405	3.5858	0.000 *	sig
H3	PA ->ENV	PA.ALU -> ENV.P	0.1653	0.912	0.362	n.s
		PA.ALU -> ENV.I	0.215	1.2133	0.225	n.s
		PA.Prof -> ENV.P	0.3242	2.0192	0.044 **	sig
		PA.Prof. -> ENV.I	0.1269	0.6732	0.501	n.s
		PA.PRD -> ENV.P	-0.243	1.375	0.169	n.s
		PA.PRD -> ENV.I	-0.277	1.5322	0.126	n.s
		PA.UNV -> ENV.P	0.2901	1.58	0.114	n.s
		PA.UNV -> ENV.I	0.1664	0.7686	0.442	n.s
H4	MTV->ENV	MTVE-> ENV.P	-0.103	0.8897	0.374	n.s
		MTVE-> ENV.I	0.3481	2.3637	0.018 **	sig
		MTVI-> ENV.I.	0.1703	1.0809	0.280	n.s
		MTVI-> ENV.P	0.1503	1.2266	0.220	n.s
PANEL B: with mediation						
Hypothesis	**Constructs**	**Structural relation**	**Ef. Direct**	**Ef. Indirect**	**Ef. Total**	**Sig**
H5	MTV->ENV-> CPROF	MTVE-> ENV.I -> CPROF	0.3102	0.0138	0.3240	n.s
		MTVE-> ENV.P -> CPROF	0.3102	-0.0250	0.2852	n.s
		MTVI-> ENV.I -> CPROF	0.3405	0.0068	0.3473	n.s
		MTVI-> ENV.P.-> CPROF	0.3405	0.0364	0.3769	n.s

Nota. n.s.: not significant and, sig.: significant.
Source: source of the search (2016).

The data of the tests detailed in Table 5 show the relationships between the dimensions of all constructs, individualized for better visualization. The results of the analysis of the research hypothesis test are in accordance with the procedures used in the study by Ahmad *et al.* (2012).

The H1 advocates that students ' motivation is positively associated with the perception of the environment. Unlike the finding by Ahmad *et al*. (2012), was not corroborated. The motivation construct is composed of the dimensions (i) external motivation and (ii) internal motivation. However, in the validation analysis of the structural model, three indicators were excluded because they did not meet the recommended values (discriminant and convergent). The obtained final relations, only the relation of MTVE-> PA.ALU; MTVE-> PA.PRD, and MTVE. -> PA.UNV were not statistically significant. Therefore, the results show that the size is the strongest internal motivation, suggesting that respondents have locus of internal control.

The H2 describes that the motivation of students is positively associated with the professional commitment, which was corroborated, a 99% confidence level, for the dimensions (MTVE ->CPROF with $\beta = 0.3102$, $t = 2.769$, $p < 0.01$ and, MTVI->CPROF with $\beta = 0.3405$, $t = 3.5858$, $p < 0.01$), bonded with the findings of the study of Ahmad *et al.* (2012). This finding suggests that respondents demonstrate professional commitment through internal and external motivational factors.

The H3, which describes that the perceived environment has a positive relationship with the student's involvement, was not corroborated, diverging from the findings of Ahmad *et al.* (2012). The only exception, positively significant, is the relationship between the dimensions PA.Prof →ENV.P ($\beta = 0.3242$, $t = 2.0192$, $p < 0.05$). This result shows that the professors of the institutional environment affect the students ' own effort. Therefore, it suggests that professors exert a great influence on their own commitment to training and, consequently, to the profession chosen by the student.

The H4, of which the student's motivation is positively associated with their involvement with the course of accounting and the accounting profession, was not confirmed. Internal motivation is not characterized as a dimension that affects students ' involvement with professors and their personal effort. Another detail is that external motivation does not affect students ' involvement with their own effort, that is, that external influences and opinions do not significantly impact the student's greater effort.

Finally, H5 sought to test whether the student's involvement acts as a mediating variable in the influence of motivation on professional commitment, and, unlike the finding of the study by Ahmad *et al.* (2012), was not corroborated. This result suggests that the motivation, in the external and internal dimensions, does not affect the professional commitment, through the involvement of personal commitment and also through the involvement with professors.

Therefore, the findings of this investigation, carried out in a teaching environment of two federal institutions of higher education in the state of Paraná, diverge, in part, from the study by Ahmad *et al.* (2012). In summary, the results suggest that perceptions of motivation and environment impact not statistically significant involvement, but the motivation affects positively and significantly the professional commitment. It reveals that a student motivated to the profession will be a good professional.

5 CONCLUSIONS

This study investigated the anticipatory socialization factors of college students of Accounting in two federal universities located in the state of Paraná, based on the study of Astin. For data collection, we used a questionnaire adapted from the study of Ahmad *et al.* (2012), applied to 71 senior students of graduation in 2016. Statistical techniques of descriptive analysis and structural equation modeling via PLS were used for data treatment.

The research results referring to the descriptive analysis indicate that the sample consisted of 54% of women, with respondents of age group predominantly between 21 and 26 years. To analyze the hypotheses, the structural equation modeling was used. According to the results obtained, it is inferred that the internal motivation dimension is the strongest, when compared with motivation originated by external factors. It evidences that the questioned students have a preponderant internal locus of control. Thus, it is inferred that the construct motivation in a complete way only affects in a statistically significant way the variable professional commitment.

The research aimed to investigate the factors that during the course of accounting course influence the construction of the professional commitment of students with the accounting profession. In the analysis of the results, the motivation variable, composed of internal and external factors, positively influences the professional commitment of accounting students to the accounting profession. Moreover, in the analysis of the motivation variable, the internal dimension was strongly related to the perception of the environment. Corroborating this result, Murray (2006) states that motivation is a byproduct of interaction with the environment and, therefore, the institution has great responsibility for this improvement.

Also, regarding the perceived environment, it was found that professors exert great influence on the student's professional commitment and, consequently, in their professional training. According to this result, Krug and Krug (2008) advocate that the professor can influence the students, either as people or as professionals, that is, the more present are the teachers in the training, the better the commitment and the perception of the environment the student has.

An interesting finding of the analysis points out that motivation does not affect professional commitment through student involvement. For Murray (2006), since the HEI is responsible for creating an environment conducive to learning, the counterpart of students is the responsibility for the investment of time and effort, aiming at their own education. In this sense, it is worth mentioning the students, when the choice of higher education, and consequently the future profession, must support the most complete information to make sure of the decision. With that, more assertive is the decision in relation to the course and the profession and, consequently, the greater the commitment of the individual.

The research is the fact that limitation have been investigated only two HEI students, which means that the results cannot be generalized. Another limiting factor is that only students were investigated last year of Accounting in both institutions. The findings instigate studies at other institutions, including the private ones, which can bring different results, especially with regard to construct "environment", due to the specificities of those HEI in relation to your organizational structure. It is also recommended that the investigation extends to other periods of graduation, not limited to students graduating from the course, aiming to capture also the perceptions of others in relation to the constructs of the model.

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IFRS AND PROBABILITY OF REPUBLISHING: A STUDY OF BRAZILIAN COMPANIES LISTED ON BOVESPA

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ABSTRACT

This study analyzed the transition and post-transition period of the adoption of the International Financial Reporting Standards (IFRS) in Brazil, and its main objective was to elucidate its implications both in republishing financial reports and in issuing an accounting audit opinion, with qualification or disapproval. This research analyzed 613 companies listed on BM&FBovespa from 2001 to 2016. The analysis was prepared through a Logit model, testing the hypotheses that the adoption of IFRS in Brazil would reduce both the probability of republishing and of issuing an opinion with qualification or disapproval. The results have indicated that both in the transition and in the post-IFRS periods there was a reduction in the probability of opinions with qualification or disapproval, with a stronger effect on the latter. These results indicate that the IFRS may have positively impacted reporting quality, but not as strongly as desired.

Keywords: Republishing. Qualification. IFRS.

1 INTRODUCTION

This study aims to analyze the effect of *International Financial Reporting Standards* (IFRS) in republishing financial reports and issuing audit opinions with qualification or disapproval. There is some evidence that the adoption of IFRS results in the improvement of the accounting information generated, reflecting in the most reliable presentation of the economic and financial position of an entity (Ball, Robin, & Wu, 2003; Barth, Landsman, & Lang, 2008; Daske, Hail, Leuz, & Verdi, 2008; Gebhardt & Novotny-Farkas, 2011; Horton, Serafeim, & Serafeim, 2013; Cameran, Campa, & Pettinicchio, 2014; Lara, Torres, & Vieira, 2008; Paananen & Lin, 2009; Rathke, Santana, Lourenço, & Dalmácio, 2015). However, as supported by Daske et al. (2008) and Christensen, Hail and Leuz (2013), such outcome may depend on

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the country's level of enforcement. Daske, Hail, Leuz and Verdi (2013) deepen the research and find that "serious" companies enjoy economic benefits of adopting IFRS, while "front" companies do not.

More recently, Leuz & Wysocki (2016) demonstrate that the evidence of the regulatory effects of accounting reports is weak, suggesting that more researches are made on the subject. This work falls within this demand, addressing the adoption of IFRS in a low enforcement country like Brazil (Durnev & Kim, 2005). In addition, some improvement actions do not necessarily imply positive changes in the quality of accounting information, as they do not include important cultural, educational and legal factors that can lead to dubious interpretations and heterogeneous practices (Ball, 2006). Finally, Jiang, Habib and Zhou (2015) claim that the empirical evidence of republishing in emerging markets is insignificant, although these markets are more vulnerable to manipulation of accounting reports. This research seeks to contribute with empirical evidence on the subject, checking whether the adoption of IFRS in Brazil has reduced the probability of republishing and issuing audit opinion with qualification or disapproval, proxies for quality of reports.

One of the regulators’ concerns is keeping the costs of a new regulation low enough so that they do not void the potential benefits of the regulation. There is evidence suggesting that the adoption of IFRS changes the form and content of accounting reports, as well as the accounting regulatory process itself, leading to an increase in compliance costs, especially regarding amendments to these publications (De George, Ferguson & Spear, 2013).

As a result of these changes, there is an increase in the costs of auditing services, giving rise to the discussion about the cost-benefit ratio of the process of aligning to international accounting standards. (Hail, Leuz, & Wysocki, 2010). Aimed at measuring gains resulting from the adoption of IFRS, Oliveira, Dias and Gomes (2014) surveyed 19 Brazilian companies with shares in the New York Stock Exchange. The results indicate that there was a 24% decrease in audit costs after IFRS, providing a positive indication for the adoption of the standard (Oliveira et al., 2014). It is worth noting that unlike the United States, the Brazilian institutional environment does not have a strict supervision and monitoring of the auditor's work, which makes the opinion analysis with qualification or disapproval so important (Durnev & Kim, 2005).

This study analyzes 613 companies listed on BM&FBovespa from 2001 to 2016, using the financial statements and audit reports obtained from the software Economatica and the website of the Brazilian Securities and Exchange Commission (CVM), in 2017. The analysis was made using a Logit model, testing the hypothesis that the adoption of IFRS in Brazil reduces both the probability of republishing and the probability of opinion with qualification or disapproval.

The results found indicate that there was a reduction in the probability of audit opinions with qualification or disapproval in the transition period of the IFRS, even considering it is a period to adapt to the new accounting system. This trend was accentuated when the post-IFRS period was analyzed, as an even more significant increase was observed in the probability of reducing the occurrence of opinions with amendments or disapproval. These results explain the robustness of the accounting reports resulting from the adoption of IFRS standards. However, this improvement in the informational environment seems to be partial, since there was no relationship between the adoption of IFRS and the probability of republication, allowing for investigations that lead to higher standards.

In this sense, this research is expected to contribute both to the academy and to the capital market, as well as to the boards of directors and shareholders and regulatory and control bodies regarding: (a) implications in the process of aligning to international accounting standards in Brazil; (b) the adoption of IFRS and its effects on the probability of increase in republications of financial statements; and (c) its effects in issuing audit opinion with reservations.

2 LITERATURE REVIEW

2.1 IFRS and the quality of accounting information

The need to implement IFRS in Brazil derives mainly from issues related to the standardization of international accounting standards, as well as the incentive to foster foreign investments in the country. A recent survey evidences that, among approximately 48,000 companies listed on the world's 85 major stock exchanges, more than 25 thousand adopt IFRS accounting standards. In addition, among companies that do not apply IFRS, more than 80% are listed on the stock exchanges of China, India, Japan and the United States (Girotto, 2017).

The introduction of IFRS has influenced accounting practices, with significant impact, particularly on the way financial reports are prepared. Prior to IFRS (the Brazilian GAAP), the Brazilian accounting standard was formulated with interests that did not prioritize information to the market and, therefore, had a lower level of information (Oliveira & Lemes, 2011). While the international accounting standard was based on the provision of information that impacts the strategic decisions of agents, especially focused on meeting investors' needs (Cavalier & Tiras, 2013).

Although the adoption of IFRS has brought more demands regarding better accounting information (IFRS, 2018), it does not necessarily lead to the extinction of fraudulent actions or to the reduction of impacts resulting from failures in accounting procedures (De George, Patel, & Zeckhauser, 1999; Dechow, Ge, & Schrand, 2010). The process of adopting IFRS in Brazil may have provided greater flexibility in the accounting treatment, which did not exist under the BR GAAP, of primary tax nature. This allows, at the same time, choices that best reflect the company's economic-financial reality and managers to manipulate accounting records. (Cavalier & Tiras, 2013).

The purpose of the audit is to be a tool capable of minimizing the impacts caused by conflicts of interest (Barry & Brown, 1985; Merton, 1987). The idea of an audit is that a third party independently ensures that the company presents information that reflects its economic-financial background under GAAP. Research relate audit quality with a number of factors, among which: audit firm size, audit insurance, whether or not a *Big Four*, change of audit firm and auditor experience, length of the relationship between the company and the audit, among others (DeAngelo, 1981; Watts & Zimmerman, 1981; Dye, 1993; Solomon, Shields & Whittington, 1999; Geiger & Raghunandan, 2002; Ghosh & Moon, 2002; Myers, Myers & Omer, 2003; Francis, 2011).

On the other hand, as regards the association of the audit with the quality of the information presented, there is an inherent difficulty to include the adoption of IFRS, since the accounting standard is relatively recent and is considered to be a broad and complex process. Although there are several measures to assess the quality of accounting information (Dechow et al., 2010), there is still no consensus on the effect of adopting IFRSs (Francis, Olsson, & Schipper, 2006; Daske et al., 2008; Dechow et al., 2010, Horton et al., 2013, Leuz & Wysocki, 2016, Marques, 2016). This work is within this context, by checking if the adoption of new standards is related to republication - an indication of low quality audit - with qualification or disapproval.

2.2 IFRS and republication

The republishing of the accounting reports refers to the disclosure of incorrect or incomplete information. The opinions expressed in the audit report may approve the accounting of amounts not seen in the original preparation of the balance sheet. The importance of these values can motivate the republishing of the balance sheet (Law No. 6,404, 1976).

A number of studies (Kinney, Palmrose, & Scholz, 2004; Stanley & Dezoort, 2007; McGuire, Omer, & Sharp, 2012; Schmidt, 2012; Francis & Michas, 2013; Lobo & Zhao, 2013; Jiang *et al.*, 2015) evidence that republishing can be considered a measure capable of assess audit quality. The results of the research done by Christensen et al. (2013) found that the readjustments of the financial statements are considered by auditors and investors to be the main indicator of poor audit quality. Previous research, such as Kinney et al. (2004) and Stanley & Dezoort (2007), show material misstatements, such as enforcement actions by the Securities and Exchange Commission (SEC) related to fraudulent financial reports. These cases, however, are considered rare and suggest very low rates of audit deficiency.

There is some evidence that the changes promoted by the adoption of IFRS in Brazil may have increased the level expected from accounting models (Oliveira & Lemes, 2011; Pelucio-Grecco, Geron, Grecco, & Lima, 2015; Linhares, Costa, & Beiruth, 2018). On the other hand, the adoption of a new model may have required the auditor to: (1) have seek qualification, (2) have changed his practices, (3) have been more careful or conservative as it is an entirely new process, or (4) any combination of the factors above. It is possible to assume that such higher qualification or greater care have some effect similar to the audit change, whose evidence points to an improvement in the quality of the report (Silvestre, Costa & Kronbauer, 2018). Thus, the adoption of IFRS may result in a higher incidence of republication due to a stronger audit. Thus, we postulate the first hypothesis (**H1**): the changes promoted by the adoption of IFRS in Brazil reduce the chance of republishing.

2.3 IFRS and reservations or disapproval

There is a conflict of interest within companies (Jensen & Meckling, 1976; Barry & Brown, 1985; Merton, 1987): managers are motivated to adopt assessment criteria that allow accounting statements to be prepared according to their own interests and distorting the original purpose of informing investors (Becker, 1998; Chen, Chen, & Su, 2001; Paulo, 2007).

According to the American Institute of Certified Public Accountants (AICPA, 2017), the auditor shall issue a qualified opinion when:

• The evidence collected by the auditor indicates that the financial statements as a whole present material misstatements.

• The auditor is not able to collect sufficient evidence to conclude that the financial statements are free of material misstatements.

The changes promoted by the adoption of IFRS in Brazil may have increased the level of complexity in accounting models. However, companies' concern as to correctly understanding and implementing the new standard has the potential to significantly improve the reporting process, using a logic similar to what may have occurred with audits, and led to the preparation of H1. This would lead to a decrease in the volume of opinions issued with qualification or disapproval because, despite their greater scrutiny potential, companies would tend to waive the requirements mentioned for the issuance of a reservation. Thus, we have the second hypothesis (**H2**): the changes promoted by the adoption of IFRS in Brazil reduce the chances of audit firms issuing opinions with qualification or disapproval.

3 METHODOLOGY

In order to verify the effects of the adoption of IFRS on the chances of republishing the financial statements and the audit opinion with qualification or disapproval of Brazilian companies listed on BM&FBovespa, data were collected from software Economatica and the CVM in 2017. Data were collected from listed Brazilian companies that disclose information on republication and that issue audit opinion with reservation or disapproval.

The study population was the total of Brazilian companies listed on BM&FBovespa. However, companies with no data, holdings with no data and financial companies were excluded. Thus, the sample consists of unbalanced panel containing 6,115 firms-year in reserve and republication regressions for 613 Brazilian companies listed on BM&FBovespa, from 2001 to 2016. This study focused on the IFRS adoption transition period (2008-2009) and on the period subsequent to the adoption of IFRS, with dummy variables for the regression models, in order to assess whether or not the introduction of the new accounting standard impacts the chances of republishing and issuing of qualified opinions.

3.1 Empirical model

The regression models used were adapted from the models of Gupta, Krishnan and Yu (2012). To test H1, Equation (1) estimates the determining factors for republishing the financial statements:

$$Prob(REP_{i.t}) = \beta_0 + \beta_1 T\_IFRS_{i.t} + \beta_2 \text{ P\_IFRS}_{i.t} + \theta\, Cont_{i.t} + \varepsilon_{i.t} \qquad \text{Equation (1)}$$

In Equation (1), variable REP admits two values: zero when there is no republication of financial statements and one when these are republished. As the purpose of the analysis was to identify if the IFRS transition impacts the republication variable, the variable T_IFRS assumes value one in the years of 2008 and 2009, indicating IFRS transition, and zero for the other years. The other variable that affects republishing is the post-IFRS, defined as P_IFRS in Equation (1) as a dummy variable that corresponds to values one for the years from 2010 to 2016 and zero for the years of 2001 to 2007, which are considered as periods before the adoption of the new standard. Cont is a vector of control variables corresponding to the variables defined in Table 2, with θ indicating the parameter vector of each control.

According to Francis Olsson and Schipper (2006), even with the adoption of IFRS standards, its real implications are unknown in terms of advances in the quality of accounting information, considering that these standards are relatively new. Dechow, Ge and Schrand (2010) claim that there are many metrics for assessing the characteristics of financial information. Therefore, another concern is to identify the effects of the IFRS on the reservations and disapproval, hypothesis (H2) to be tested by Equation (2).

$$Prob(Res\ ou\ Repr_{i.t}) = \beta_0 + \beta_1\, T\_IFRS_{i.t} + \beta_2 \text{ P\_IFRS}_{i.t} + \theta\, Cont_{i.t} + \varepsilon_{i.t} \qquad \text{Equation (2)}$$

Res or Repr is a *dummy* that behaves as answer variable in Equation (2), being value one if the company has issued opinion with qualification or disapproval in the year of *t* and zero otherwise. To assess this variable, the same independent variables of Equation (1) were considered.

3.2 Definition of variables

To test hypothesis of said regression models, an estimate was made using the dependent and independent variables described on Table 1:

Table 1
Dependent and independent variables of interest

VARIABLE	DEFINITION
Independent variables	
Republication	A *dummy* variable defined as one if there was republishing of financial statement and zero otherwise.
Qualification or disapproval	A *dummy* variable defined as one if the company has received an opinion with qualification or disapproval, and zero otherwise.
Variables of interest	
Transition of IFRS	*IRFS transition dummy* defined as one for the years from 2008 to 2009, and zero otherwise.
Post-IFRS period	Post-IFRS *Dummy* defined as one for the years from 2010 to 2016, and zero otherwise.

Source: Prepared by the author (2018).

Table 2, in turn, shows the control variables to test its implications regarding the IFRS transition periods and the period subsequent to the transition of IFRS.

Table 2
Independent variables of control

CONTROL VARIABLE	**DEFINITION**
LOSS	A *dummy* variable defined as one if the net profit is negative and equal zero otherwise.
LEVERAGING (ALAVFIN)	Long-term debit plus the current installment of the long-term debt, divided by the total assets.
Size (TAM)	Size od the company measured by the natural logarithm of the value of its total asset.
Return on assets (ROA)	Return on assets, measured as net profit divided by the total assets.
Big Four (BIGN)	A *dummy* variable defined as one if the auditor is *Big Four* (Deloitte, Ernst & Young, KPMG or PricewaterhouseCoopers) and as zero otherwise.
Specialist (ESPEC)	Variable of indicator defined as one if the auditor is specialized in the sector, that is, when a company operating in more than one segment, and as zero otherwise makes the audit.
Complexity (COMPLEX)	An indicator variable defined as one if a company operates in more than one field of activity, that is, more than one segment of economic activity.
i e *t*	Indicators of company and year, respectively.

Note. These variables were winsorized at 5%.
Source: Prepared by the author (2018).

The control variables were defined based on previous results in the literature (Larcker, Richardson & Tuna, 2007; Dechow, Ge and Schrand, 2010; Cassell, Myers, Seidel, & Zhou, 2016, Lo, Ramos and Rogo, 2017). It can be more difficult for companies with losses (LOSS) to produce a clear report because they need to further justify the viability of the business, which may increase the chances of an adverse event (republication or qualification). Leveraging (ALAVFIN) may have a similar effect, as it means the company is more exposed to financial risk. Larger companies (TAM) may have more accounting information; therefore these may be more subject to adverse events. While companies with good performance (ROA) may have less to explain, resulting in lower concerns and lower chances of adverse events. Audit conducted by one of the major audit firms (BIGN) may reduce the chances of an adverse effect, as they have more expertise and may have a more strict reporting process, increasing the quality of the report. The same effect is expected from the fact that the auditor is a specialist (SPEC). On the other hand, the complexity of the operation (COMPLEX) also has a side effect, making the preparation of the report more difficult and, therefore, exposing the company to more adverse events.

4 RESEARCH RESULTS

4.1 Result of the descriptive statistic

Table 3 shows the descriptive statistic of variables used in the models studied – Equations (1) and (2).

Table 3
Descriptive statistics

Variables	**Average**	**SD***	**Minimum**	**T1**	**Median**	**T3**	**Maximum**
REP	0.00	0.07	0.00	0.00	0.00	0.00	1.00
Res or Repr	0.06	0.23	0.00	0.00	0.00	0.00	1.00
T_IFRS	0.13	0.33	0.00	0.00	0.00	0.00	1.00
P_IFRS	0.67	0.47	0.00	0.00	1.00	1.00	1.00
LOSS	0.35	0.48	0.00	0.00	0.00	1.00	1.00
TAM	12.96	2.88	5.31	11.58	13.55	14.98	17.07
ROA	-0.06	0.30	-1.14	-0.03	0.02	0.07	0.18
ALAVFIN	1.23	4.99	-11.40	0.00	1.40	2.40	14.50
ESPEC	0.88	0.33	0.00	1.00	1.00	1.00	1.00
COMPLEX	0.06	0.24	0.00	0.00	0.00	0.00	1.00

BIGN		0.63	0.48	0.00	0.00	1.00	1.00	1.00

Note. *SD = standard deviation. REP = republication; Res or Repr = qualification or disapproval; T_IFRS = period of transition IFRS (2008-2009); P_IFRS = IFRS post-transition period (2010-2016); LOSS = loss; TAM = size of the company; ROA = return on assets; ALAVFIN = level of financial leveraging; ESPEC = specialist; COMPLEX = level of complexity; BIGN = if audited by a *Big Four*. The sample comprises 613 companies/year listed at Economatica and 6,115 notes collected from 2001 to 2016.
Source: Prepared by the author (2018).

Table 3 shows that the REP (republishing) and Res or Repr (qualification) variables present low values, since the first represents only 0.4% of the sample (referring to 35 republications detected during the analysis period), and the second corresponds to 6% of the total. In addition, most are found in the post-IFRS period (P_IFRS) - 67%, on average -, and only 13% during the transition period (T_IFRS).

A considerable share, representing 35% of the total, record losses. The strong negative result is reinforced by the negative average ROA (-0.06). This scenario is possibly related to the period of study, which outlines the period of the subprime crisis (Freitas and Cintra, 2008) and the Brazilian crisis (Veloso & Bonelli, 2016; Barbosa, 2017). Regarding size (TAM, total assets in logarithm), the companies are large, with an average of R$ 425 million in assets; the smallest one has around R$ 202 million in assets. It is worth noting that the average corporate debt (ALAVFIN) is above one, indicating that they show relatively high indebtedness. Moreover, 88% of the companies are audited by specialists, and few are found to be complex (COMPLEX) - 6% of the total. Finally, almost two-thirds of companies are audited by the Big Four (BIGN), which are considered the most important audit firms in the global economic scenario and, theoretically, holds the highest standards.

4.2 Results of mean tests

Table 4 compares the means of the variables hereunder, seeking to assess if there are differences between the transition and post-IFRS periods.

Table 4
Mean test

	Transition of IFRS (n = 1254)		Post-IFRS period (n = 4389)			
Variables	**Mean**	**Standard deviation**	**Mean**	**Standard deviation**	**Difference**	**P-value**
Res or Repr	0.0808	0.2725	0.0392	0.1941	-0.0416	0.0000***
REP	0.0058	0.0758	0.0042	0.0646	-0.0016	0.3785
TAM	12.7694	2.6662	13.1259	3.0434	0.3566	0.0000***
ROA	-0.0437	0.2750	-0.0702	0.3135	-0.0264	0.0005***
ALAVFIN	1.2188	5.1102	1.2317	4.8838	0.0130	0.9194
ESPEC	0.8503	0.3568	0.8992	0.3012	0.0488	0.0000***
COMPLEX	0.0512	0.2205	0.0664	0.2491	0.0152	0.0123**
BIGN	0.5651	0.4958	0.6849	0.4646	0.1198	0.0000***

Note. REP = republication; Res or Repr = qualification or disapproval; T_IFRS = IFRS transition period (2008-2009); P_IFRS = post-IFRS transition period (2010-2016); LOSS = loss; TAM = size of the company; ROA = return on total asset; ALAVFIN = level of financial leveraging; ESPEC = specialist in the sector; COMPLEX = level of complexity; BIGN = if audited by a *Big Four*; Difference = difference between the mean in the post-IFRS period and the transition period; */**/*** = statistically significant at the levels of 10%, 5% and 1%, respectively. The sample comprises 613 companies/year listed at Economatica and 6,115 notes, collected from 2001 to 2016.
Source: Prepared by the author (2018).

Table 4 shows that the significant variables for the Student's t-test were the dependents Res or Repr and those of control TAM, ROA, ESPEC, COMPLEX and BIGN. Therefore, it can be understood that qualifications or disapprovals (Res or Repr) were higher in the transition period than in the post-IFRS period, due to an improvement in the accounting standards resulting from the adoption of IFRS. The results of this study are consistent with the results found by McMillan et al. (2003), and McMillan et al. (2003) and Schmidt (2003) 2012; Francis & Michas, 2013; Lobo & Zhao, 2013).

The size of the companies (TAM) was found to be higher in the post-IFRS period than in the transition period. This was expected due to the new IFRS (Hung & Subramanyam, 2007; Pires, Decourt, Camargo, & Siebel, 2012). Similarly, a negative ROA is identified, which becomes more negative from one period to another, indicating a possible persistent effect of the subprime crisis (Freitas & Cintra, 2008) and the subsequent Brazilian crisis (Veloso & Bonelli, 2016. Leveraging presents no significant difference. An increase in the number of specialists

(SPEC) in the post-IFRS period is also observed in comparison to the transition period, which may be related to the increase in the Big Four reported hereafter. Regarding complexity (COMPLEX), the same situation observed in the variable SPEC is observed: companies identified in the study operate in several segments in the post-IFRS period, indicating a diversification in their operations. Finally, the variable BIGN indicates a significant increase in the hiring of a Big Four, which may relate to a greater expertise in IFRS and a quest to reduce compliance risks.

4.3 Regression results

Tables 5 and 6 show the results of two regression models, republication (Equation 1) and qualification (Equation 2), with the Logit coefficient (non-linear), as well as the mean marginal effect (an average of the non-linear effect) and the P-value.

Table 5
Regression of the variable republication (REP)

Variables	Logit Coefficient	Default error	P-value	dy/dx Coefficient	Default error	P-value
T_IFRS	0.8722	0.5808	0.1330	0.0042	0.0028	0.1380
P_IFRS	-0.0437	0.6871	0.9490	-0.0002	0.0033	0.9490
LOSS	1.2500	0.4827	0.0100**	0.0060	0.0030	0.0480**
TAM	0.2506	0.1118	0.0250**	0.0012	0.0007	0.0650*
ROA	1.2825	1.0167	0.2070	0.0062	0.0055	0.2560
ALAVFIN	-0.0242	0.0262	0.3500	-0.0001	0.0001	0.3770
ESPEC	0.8204	0.4387	1.8700	0.0040	0.0021	0.0640*
COMPLEX	0.8111	0.4642	0.0810*	0.0039	0.0020	0.0500**
BIGN	-1.6282	0.4346	0.0000***	-0.0079	0.0027	0.0040***

Note. REP = republication; Res or Repr = qualification or disapproval; T_IFRS = IFRS transition period (2008-2009); P_IFRS = post-IFRS transition period (2010-2016); LOSS = loss; TAM = size of the company; ROA = return on total asset; ALAVFIN = level of financial leveraging; ESPEC = specialist in the sector; COMPLEX = level of complexity; BIGN = if audited by a *Big Four*; */**/*** = statistically significant at the levels of 10%, 5% and 1%, respectively. This table describes the Equation (1) on the mean effect per Logit and the mean marginal effect, also estimated by Logit, with default errors clusterized at firm level. The sample comprises 613 companies listed on BM&FBovespa and 6,115 notes with fixed sector effect, collected from from 2001 to 2016.
Source: Prepared by the author (2018).

Table 5 describes the Logit coefficient (non-linear) and the mean marginal effect of each of the variables on the probability of republishing. No statistically significant results were found both in the transition period (T_IFRS) and in the post-IFRS period (P_IFRS). Thus, the hypothesis that audits may have strengthened the process is ungrounded. However, these results are in line with Ball (2006), noting that the adoption of IFRS does not necessarily mean immediate improvement, once cultural, political, and other aspects may result in dubious interpretations. Another point to highlight is the low variety of data. As republishing is a relatively rare event, the model may be incapable of properly capturing the effects thereof.

As for controls, the variables found to affect the republication are LOSS, TAM, ESPEC, COMPLEX and BIGN variables. Analyzing the coefficients, it is possible to warn that a loss (LOSS) increases by 0.6 p.p. the chance of republishing, indicating that companies with losses are more likely to have problems in preparing a reliable report. This is a significant economic effect, considering that the average republishing rate is low (0.06% at transition and 0.04% post-IFRS). As for company size (TAM), a variation of one log point in the total asset increases the chance of republishing by 0.12 p.p., despite the poor statistical ratio. Despite specialized in the sector (SPEC), the audit has an insignificant effect only on the mean marginal effect, with an increase of 0.40 p.p. in the chances of republishing. More complex firms, operating in more than one sector (COMPLEX), also show a statistically higher significant chance of republishing, of 0.2%, probably due to the difficult nature of the report. Finally, an audition conducted by a Big Four (BIGN) is related to a 0.79 p.p. lower possibility of republishing, indicating higher quality in the audit process. ROA and leveraging are not related to the chance of republishing.

Table 6 shows the regression of the variable qualification estimated by Logit and by the coefficient (dy/dx), presenting the mean marginal effect:

Table 6
Regression of the variable qualification or disapproval (RES or REPR)

Variables	Logit Coefficient	Default error	P-value	dy/dx Coefficient	Default error	P-value
T_IFRS	-0.4319	0.1632	0.0008***	-0.0227	0.0073	0.0002***
P_IFRS	-0.8640	0.1949	0.0000***	-0.0454	0.0120	0.0000***
LOSS	1.0484	0.1351	0.0000***	0.0551	0.0110	0.0000***
TAM	0.0805	0.0640	0.2090	0.0042	0.0034	0.2120
ROA	0.1084	0.4157	0.7940	0.0057	0.0222	0.7970
ALAVFIN	-0.0059	0.0134	0.6580	-0.0003	0.0007	0.6550
ESPEC	-0.1848	0.5016	0.7130	-0.0097	0.0263	0.7120
COMPLEX	0.2534	0.5455	0.6420	0.0133	0.0281	0.6360
BIGN	-0.7692	0.2277	0.0001***	-0.0405	0.0141	0.0004 ***

Note. REP = republication; Res or Repr = qualification or disapproval; T_IFRS = IFRS transition period (2008-2009); P_IFRS = post-IFRS transition period (2010-2016); LOSS = loss; TAM = size of the company; ROA = return on the total asset; ALAVFIN = level of financial leveraging; ESPEC = specialist in the sector; COMPLEX = level of complexity; BIGN = if audited by a *Big Four*; */**/*** = statistically significant at the levels of 10%, 5% and 1%, respectively. This table describes the Equation (2) on the mean effect per Logit and the mean marginal effect, also estimated by Logit, with default errors clusterized at firm level. The sample comprises 613 companies listed on BM&FBovespa and 6,115 notes with fixed sector effect, collected from 2001 to 2016.
Source: Prepared by the author (2018).

Table 6 indicates that statistically significant results were found in the transition periods (T_IFRS) and post-IFRS (P_IFRS), supporting H2. A reduction of 2.27 p.p. was observed in the probability of issuing audit opinions with qualification or disapproval (Res or Repr), with an even more critical economic effect in the post-IFRS period, when there was a reduction of 4,54 p.p., which is an important effect when compared to the means of 8% and 4% in the transition and post-IFRS periods. Therefore, some indication point out that accounting reports have improved quality, corroborating results obtained in other scenarios in Brazil and abroad (Oliveira & Lemes, 2011; Pelucio-Grecco et al., 2015; Linhares, Costa & Beiruth , 2018)

As regards controls, LOSS continues with a highly significant result, showing that losses also have a significant effect on the chances of qualification or disapproval (Res or Repr), with an increase of 5.51 p.p. Auditions conducted by a Big Four continues with a similar result on qualification and disapproval, with a reduction of 4 p.p. in the probability of occurrence of such problems. The remaining controls were not significant.

Thus, there is some evidence pointing that the adoption of IFRS may not have had such a strong impact on the financial statements, in view of the lack of results in republishing demonstrated hereof. This result is in line with the assumptions by Ball et al. (2003) that economic incentives stands above accounting standards in determining the quality of financial statements. However, evidences indicate some improvement, since the amount of opinions dropped during the post-IFRS period.

5 CONCLUSION

The objective of this study was to analyze the effect of International Financial Reporting Standards (IFRS) on the republication of financial reports and issuance of audit opinions with qualification or disapproval. Using the database of Economatica and CVM, a sample was collected to answer the question of the research. From 2001 to 2016, 613 publicly traded companies listed on BM&FBovespa were studied hereunder.

The results of this study indicate a positive effect of the adoption of IFRS on the quality of the Brazilian accounting statements when evidenced a decrease in the occurrence of qualification and disapproval by audit firms. However, no effect related to the possibility of republishing was observed, that is, although audit firms decrease the amount of qualifications and disapproval, no reduction is observed in the possibility of republishing them. In this sense, the results of this research may be useful for regulators such as the CVM, the Accounting Pronouncements Committee (CPC) or the International Accounting Standards Board (IASB) itself – whose purpose is bringing transparency, accountability and efficiency to financial markets – insofar as it indicates a partial improvement in the quality of the financial statements.

This study does not analyze audited private companies, and is limited to listed companies. As it involves private companies with lower disclosure requirements, the effects of IFRS could be extended if such companies were analyzed. Finally, future research should verify the effects of adopting international standards beyond the universe of listed companies. Finally, it is worth emphasizing that there are opportunities for new studies, researching, for example, other forms of assessing the adoption of IFRS, namely: i) which are the most cost-effective organizations; ii) what are the effects of the adoption of IFRS in the use of accounting information by other users; iii) to check, in detail, if the companies adopt IFRS, that is, to assess the level of compliance with the new rules established by this accounting paradigm; among others.

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AN ANALYSIS OF THE FREE-RIDING EFFECT, IN AN ENVIRONMENT OF SHOPPING CENTRE, IN SALES PROMOTIONAL SEASON

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ABSTRACT

The general aim of this paper is to analyze whether the free-riding tendency happens in an environment of a shopping center, on Christmas season, in sales promotional campaign. The free-riding is defined as an effect of actuation where “a member of a group obtains benefits from group membership, but does not bear a proportional share of the costs of providing the benefits” (Albanese & Van Fleet, 1985, p. 244). This effect is seen under the perspective of The Theory of Economic Regulation, according to which the regulation is instituted primarily for the protection and benefit of the general public or some large subclass of the public (Stigler, 1971). To measure the free-riding, it was used a proxy of benefits enjoyed by agents who don’t (proportionally) contributed with the intervention, as well as the application of questionnaires by interviews with store/kiosk managers in shopping centers. From the results obtained, it was possible to find out evidences for the use of regulation benefits by non-participants stores/kiosks. Therefore, it can be concluded that the free-riding in fact happens in an environment of a shopping center, on Christmas season, in sales promotional campaign.

Keywords: Theory of Regulation. Free-riders. Shopping Center.

1 INTRODUCTION

Consider a situation where the Board of Directors of a condominium plays the role of regulatory agent and the tenants play the role of regulated agents. The standards imposed by such Board shall result in benefits and costs to the regulated agents, but not always proportionally, since the tenants who shall move to the condominium after capital contributions resulting from some standard[1] shall enjoy the same benefits, but without the relevant costs.

Alternatively, consider a context where a teacher of a discipline (regulatory agent) requires from the students (regulated agents), through some requirements (rules) and guidelines, the preparation of a group work presentation. Uncommitted students (Free-riders[2]), who do not take part in the meetings to prepare the work, can benefit from the same grade as other members of the group, without having made a proportional effort, considering that

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[1] The standards are limited because they do not have the ability to predict all possible situations and behaviors.
[2] Hitchhiker.

committed students do not have formal authority to punish or remove free riders from the group and, therefore, consent to such behaviours within the group.

This relationship between regulatory and regulated agents was initially established by the Economic Theory of Regulation (Stigler, 1971), in a context of State and economic groups. According to this theory, regulation is mainly established for protecting and benefiting of the general public or some large subclass of the public. An economic group may seek regulation or a regulation can simply be imposed thereon, which is acquired, shaped, and operated mainly for the group's benefit (Stigler, 1971).

According to Stigler (1971), the State is the regulatory agent with the exclusive power to waive and selectively assist, through some benefits, or to harm a large number of economic groups. Stigler (1971) also highlights that financing company activities, such as regulation, leads to the usual free-rider problem. In general, the free-rider ends up enjoying a certain benefit without having made a proportional contribution or without having contributed at all (cost) towards this benefit.

Free-riding is defined as the effect of actuation where "the member of a group benefits from the group membership, but does not support a proportional sharing of the costs to providing such benefits" (Albanese & Van Fleet, 1985, 244). The chances of success of the intervention (regulation) increase as the number of participants potentially benefiting thereof is small, but also when the market position is symmetrical, since the asymmetry can encourage the emergence of free-riders (Downs, 1999).

Considering this effect, the request for support is complex, as individual members can not be excluded from the regulation benefits, even if they have not shared the same costs (Stigler, 1971). According to O'Neill (2010), free-riding occurs when a "positive externality" is drawn from third-party actions, that is, a benefit is obtained without having paid for it. In addition, "people completely unrelated with action can not be prevented from enjoying these benefits" (Stigler 1971: 14).

Thus, it is possible to observe that although developed for the industry (sector), the Economic Theory of Regulation (Stigler, 1971) can be present in different scenarios, whenever there is a relation of regulatory and regulated agent. In this sense, this research seeks to analyse, from an empirical perspective and motivated by observation, whether some shopkeepers, from shopping malls and shopping centres that do not participate in promotional and sales campaigns promoted by their managers, benefit from increased sales and/or other gains obtained during the campaigns.

The observation of these events raises some questions: why, despite the rules (contracts between the parties) defining the costs, benefits and penalties, is there no unanimous decision in terms of adherence to the campaigns? Do shopkeepers who do not participate get economic and intangible benefits (e.g. image) related to the campaigns? Could this behaviour be identified as free-riding, motivated by incomplete contracts[3]? Is the non-participation of some shopkeepers a result of failures in the structure of the regulation and the administrative rules of the mall? Do non-participating shopkeepers perceive failures in the rule and act opportunistically? Is it possible to prevent non-participating stores from enjoying the benefits generated? Is it possible to limit customers' access to non-participating stores? Do the prizes offered during promotional periods impact customer's decision-making model, making participation disadvantageous? Finally, faced with these questions, the shopping centre in the period of promotional campaigns was selected in order to verify if the free-riding effect occurs and if the event can be explained by the assumptions under the Economic Regulation Theory (Stigler, 1971).

Dias (2014, p. 43) claims that "the concept of free-riding applied to retail (...) addresses the issue of non-capture of the use of a resource among players in the market and, therefore, the market of such resource shall not produce an optimal result". Therefore, permeating the business environment, where the maximization of results with the minimum or the absence of costs is desired, this work seeks to answer the following question: can the free-riding effect be

[3] Incomplete contracts "are potential sources for opportunistic behavior, implying market failures and higher transaction costs" (Silva & Brito, 2013).

verified in a shopping centre environment, during Christmas time in promotional sales campaign?

This work seeks to clarify the regulation model and the impacts thereof. Moreover, it sought to extrapolate the application of the Economic Regulation Theory, fundamentally focused on the intervention of the State in the economy, aimed to regulate market imbalances and promote economic development in other economic environments and systems, setting new regulatory agents and new groups of interest.

The evidence found by checking the effects of regulation on the performance of participating and non-participating stores in a promotional campaign during Christmas time may contribute to the behavioural analysis of the agents involved thereunder, in addition to encourage the development of further studies in more specific scenarios.

2 THEORETICAL REFERENCE

2.1 Regulation

The regulation is established to provide potential uses of resources and powers to improve the condition of economic groups. The main task of the Economic Theory of Regulation is to explain who shall receive the benefits or burdens of regulation, how the regulation shall be, and its effects on resource allocation. According to Stigler's (1971), there are two main actors in this relation: the State, as regulatory agent; and economic groups, as regulated agents.

The first agent is a potential resource or a threat to all economic groups, since it has the ownership of a basic tool not shared with others: the power to coerce or prohibit. Such power allows the agent to make economic decisions without the consent of the regulated agents, being able to selectively assist or harm a large number of groups (Stigler, 1971).

The second agent is the economic groups that actively seek regulation or on which regulations is imposed. At first, regulation is made for protecting and benefiting of the general public or some of the largest subclasses of the public. Among these agents occupations and groups of interest (Stigler, 1971) are considered industries (sectors). Farhat (2007, p. 145) adopts the following concept for groups of interest: "it is any group of physical and/or legal persons that are formally or informally bound by certain purposes, interests, aspirations or rights, which may be shared from other members or segments of their class".

The theory of Stigler (1971) is based on the intervention of the State in the economy. This intervention, however, can lead to other environments and economic systems, thus forming new regulatory agents and new groups of interest. As a potential resource for groups, the regulatory agent - whatever it may be - can offer benefits in the following forms: allowance, control of new competitors, pricing and power over supplementary and replacement items. Such benefits can be observed in the licensing of occupations (and other groups); the use of regulation in this format effectively blocks the entry when unlicensed occupational practice configures a criminal offense (Stigler, 1971).

It is widely known that car drivers must have the National Driver's License (CNH) record; doctors must have the Regional Council of Medicine (CRM) record; lawyers must have the Brazilian Bar Association (OAB) record; as well as accountants, who must have the Regional Accounting Council (CRC) record. Without their respective enrolment, these professionals have no legal permission to perform their functions and, therefore, are useless from the ethical-professional and the legal scope.

The criminal offense may imply monetary and non-monetary penalties. For example, at the moment of an offense, according to the transit regulatory agency, Detran, the penalty may not be limited to fines, but extends to the suspension of the driver's licence and/or involves legal proceedings.

Other occupations may further require specific certifications rather than qualifications to perform their activities. In these cases, these certifications can serve as a barrier or entrance door, as it is the case of investment professionals. According to Leite (2010), there are some compulsory certifications in Brazil according to the position of each investment professional.

The main ones are the National Certificate of Investment Professional (CNPI), Anbima Professional Certificate -10 (CPA-10) and Anbima Professional Certificate (CPA-20).

On the other hand, Moreno (2014) states that students who seek a scholarship abroad normally also need a certificate: the proficiency in English or native language of the destination country; the most common one are: TOEFL (Test of English as Foreign Language), IELTS (International English Language Testing System) and CPE (Certificate of Proficiency in English).

This is not different in firms and sectors. Bars, as well as other undertakings, need permits to operate. Sectors may demand specific requirements. For example, food safety is indispensable for the food industry, meaning that companies must be certified in the international standard International Organization for Standardization (ISO 22000). It should be noted that certification may or may not be mandatory and may allows for other gains, such as: increase in receivables, advertising, and even intangibles, such as competitive advantage and image gains.

In short, the challenge of the regulation is to find out when and why a group is able to use the regulatory agent for its own purposes or is indicated by the regulatory agent to be used for other purposes (Stigler, 1971).

2.2 Limitations

As exemplified, it would be a mistake to think that licensing is limited to one group type - occupations. The regulation is observed to take different forms: qualifications, certifications, permits, among others. However, despite the benefits, regulation generally presents some limitations. The group council may admit strangers as members, and a cohesive opposition may take place under the regulation (Stigler, 1971).

In the case of the Accounting Pronouncements Committee (CPC), an authority formed by Abrasca, Apimec Nacional, Bovespa, Federal Accounting Council, Fipecafi and Ibracon, limitations are observed. The membership is composed of two officers of each entity, mostly accountants. The admission of strangers - not accountants - may sharpen the conflict of interest explained by the Agency Theory[4].

Still regarding the CPC, the admission of other entities or guest experts, such as the Internal Revenue Service, may allow that external member to significantly influence the decision making, even if these do not have voting rights. Thus, when there is a conflict of interests between guest members and the group, guest members may oppose the group in order to prevent a regulation or the actions thereof.

Another limitation is the presence or absence of costly procedural guarantees (administrative costs). Moreover, the effects of regulation on the economic group can be costly or not, resulting in benefits and/or damages for the agents. Regulations that are harmful to the public are the costs of some social goal or, occasionally, distortions of the regulatory philosophy (Stigler, 1971).

In addition, the chances of success of the regulation is subject to market conditions: the balance between the group’s demand and supply and the elasticity thereof, that is, factors beyond the total control power. In a group with numerous members, there is a pattern of regressive benefits. On the other hand, when a group make efforts to obtain favourable regulation, and this implies costs originated from the support request, these are greater for a pervasive group, when compared to a concentrate group (Stigler, 1971 and 1974).

These limitations are foreseeable and, therefore, all of them must take part in calculating the profitability of the group regulation. Stigler (1971) also stresses that the support request is complex, because strangers (non-members) can enjoy the benefits of regulation even if they do not share the costs thereof.

2.3 F*ree-rider theory*

According to Albanese and Van Fleet (1985, p 244):

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[4] This theory seeks to explain the relationship between two or more agents who, although committed to the same activity, have different goals and individual attitudes (Jensen & Meckling, 1976)

In everyday talk, it is often said "everyone wants something for nothing". Of course, not all people everywhere and at all times want to literally benefit without bearing any cost. Nevertheless, it is generally true that people acting rationally try to minimize costs versus benefits received.

At first, the regulation seems to occur only between regulatory and regulated agents. Until the moment the presence of a third agent is observed: the free-rider (hitchhiker).

According to Mankiw (2006), free-riding is "someone who receives the benefit of a good, but avoids paying for it." As for Gremaud (2003), the free-riding, in addition to hitchhiking, is considered opportunistic. Albanese and Van Fleet (1985, p. 244) state that "the term 'free-rider' refers to a member of a group that gets benefits from being a member of the group, but does not support a proportional share of the costs to provide such benefits". Stigler (1974, p. 360) complements that "cheap rider" is a more accurate term for a member of a group, as receiving member benefits normally involves some cost.

A notorious example of the agent occurs in the simple collection of fruits. There is no harvest without someone having planted. Slack, Chambers and Johnston (2002) state that any operation that generates goods or services, or a mixture of both, uses a transformation process based on an input-transformation-output model. Seeds and other inputs are the input resources, which are transformed and result in the fruits, that is, the outputs.

Comparable to the model, the costs of regulation are our inputs for the regulatory agent to perform transformations, so that outputs identified as benefits are generated. We usually identify (free-rider) agents that do not contribute with as many inputs as expected, while others do.

In Brazil, for example, workers regulated by competent bodies there must pay contributions for the common good - usually federal labour taxes. While unregulated workers, such as self-employed undeclared workers, do not make these same contributions, but enjoy the benefits thereof.

In line with the popular saying "There's no such thing as a free lunch"[5], the free-rider theory supports the idea that there is a cost for everything that has limited access, even if it is supported by third parties. Stigler (1974, p. 359) states that although it is so simple, it should be apparent that free-riders, as well as lunches, can not be totally free. If the entity does not bear the cost someone is paying for it.

Olson (1965) explains how theory is a trend that aims to affect group formation and individual productivity inside it: indicates its use for theoretical and professional management with implications for organizational unit projects; provides a reasoning for the reflection on the effect of the group size on productivity, in a warning to managers of possible negative influences. This theory helps explain why some potentially useful groups never form up, and suggest useful counterforces for the trend.

At first, the essential assumption that individuals act rationally was applied. For Albanese and Van Fleet (1985, p. 245), "rationality" means that an individual has an ordered and defined set of preferences and "selfish" interests; when feeling free to act, the individual chooses effective behaviours to achieve those preferences.

The main challenge of the theory lies in the individual actor and its assessment of the network of expected benefits when contributing to the common interests of the group compared to the benefits of the free-riding effect (Stroebe & Frey, 1982). Group members can decide to free ride, even if everyone is enthusiastic about the group and committed to its purpose. A consensus in the sense of desiring group benefits does not imply a consensus in sharing the costs of such benefits (Olson, 1965).

Therefore, the main characteristic of a gathering of individuals to form a group is their common interest. The essence of the group is what provides an inseparable and generalized benefit. Olson (1965) addresses the group by two different points: common interest of the

[5] Proverb popularized by the eonomist Milton Friedman. In 1975, the phrase was the title of his book, describing the concept of "opportunity cost" in economic literature (Friedman, 1975). Known within a nineteenth-century context, the term "free lunch" has the literal meaning in that American bars offered a "free lunch" as long as its consumers bought the drink. The idea is that it is impossible to get something for nothing.

members x individual interests of the members. Although the group has a common interest, its members also have individual interests. The generation of conflict of interests is explained by the Agency Theory.

Regarding the interests and the benefits, it is worth divide them into public and private goods. At first, it is necessary to define the idea of "good": it is anything tangible or intangible that meets one or more needs and/or desires of an individual, and can be differentiated by its levels of exclusivity (Albanese & Van Fleet, 1985, p. 246).

In a group, a private good is where it is feasible or economical to remove one or more members, while a public good does not admit such removal. An example is the job promotion of a member as a result of their participation in the activities of the group. Job promotion meets only individual interests, not collective interests, even if more than one member was promoted. Thus, it is a private asset. In contrast, in the public good the status is shared by all group members, as a result of meeting the collective goal. No group member can be removed, but not all members can equally share the status (Mckenzie & Tullock, 1978).

In practice, the goods provided by the groups vary between the two types. As public goods meet the common interests of the group, they are the main focus of the theory. In forming a group of this kind of good, for an equal distribution of benefits, it is not logic that a potential member bears the costs of organizing the group, since the individual shall receive the same relevant share of the public good as those who shall bear the costs. It is more interesting to let another person bear this cost. It must be warned that, if all potential members act so, the group shall not be formed and the public good, joint interest of the group, shall not be provided (Albanese & Van Fleet, 1985).

Castro, Neves and Scare (2015, p. 386) complement that, in the case of associations:

> The associates would be less willing to assume a fraction of the costs of a collective good offered if they realize that it is possible to take advantage of a collective good without financially contributing thereto. In other words, the producer does not bear the costs of association, but takes advantage (a ride) on the collective goods produced by it. At the end, as paying producers perceive that some of them pay and others do not, but everyone obtains benefits, there is a clear tendency these shall stop contributing as well, and as a result the association shall cease to exist, as well as its collective assets offered.

Once the group is formed, its size influences members' decisions in contributing to the public good. There are three factors that explain the influence of group size on free-riding: visibility, perceptibility and individual share of the good (Albanese & Van Fleet, 1985).

First, the members of a small group are motivated to monitor free-riding, due to the significant increase in the burden of providing the public good generated by free riders. As it is a small group, its members can easily notice if anyone is contributing to the public good. The more it happens, the less likely it is for the member to choose to free-ride, because others shall notice it and may also become free riders, in order to avoid being harmed. If everyone does that, the public good shall not be provided. Therefore, to prevent this from happening, members shall make their contributions to the public good noticeable (Buchanan, 1965).

The challenge is that with the increase of the group, the visibility of the individual contribution reduces, making free-riding more likely to happen. In addition, with the growth of the group, the motivation to monitor free-riding decreases, since the impact of this practice is distributed among the large number of members of the group (Albanese & Van Fleet, 1985).

Secondly, members of small groups are capable of realizing that their individual contributions to the public good shall make significant differences in the total amount of goods provided and in each share of the good of the members. However, as the group expands, it becomes easier for a member to conclude otherwise, and therefore, an individual acting rationally shall tend to free-riding (Albanese & Van Fleet, 1985).

Finally, it is noticed that the smaller the group, the greater the relative share of the public good received by each member. This last factor is in line with the limitation described by Stigler (1971) that in a group with a large number of members there is a pattern of regressive benefits. On the other hand, the costs for each member are higher in a small group if compared to a larger group (Albanese & Van Fleet, 1985).

Regarding costs, a dominant member of the group may be willing to bear all costs of providing the good. Olson (1965, p. 34) makes a remark on very small groups: "The greater the interest of a member in the public good, the higher their probability to obtain a significant proportion of the total benefit of the good, so that these shall contribute even if all costs must be borne alone"

In summary, the success chances of the intervention (regulation) increase as the number of potential beneficiaries is small, but also when their position in the market is symmetrical, since asymmetry may encourage the emergence of free-riders (Downs, 1999).

2.3.1 The "problem" of free-riding

In 1965, labour unions were concerned with the free-riders, although the practice was disregarded by the major labour movement theories of the time (Olson, 1965).

The idea of the free-rider is now more popular, even if superficially. In routine situations, in the work or academic environment, it is possible to identify these agents, as well as in organizational environments.

The problem of the free-rider is addressed by Stigler (1974), more precisely as the problem of the cheap rider. Stigler claims that, once becoming aware of a frequent or typical asymmetry of interests among different agents within a group, the individual incentives for agents to participate in a joint venture are substantial.

O'Neill (2010) adds that there is only "problem" when comparison is made with what might have been done to prevent this - an alleged inefficient underproduction of the good in question. In other words, the problem is that, if the good did not have its non-exclusive nature, things could have been even better.

2.3.2 Solving the "Problem" of the Free-rider

According to O'Neill (2010), there would be a possibility of trading with non-contributing users (free-riders) under certain conditions, insofar as the economic group would prove to be better - that is, there would be a gain of Pareto Efficient[6]. This arrangement is an entrepreneurial decision that does not involve coercion on either side. However, it is evident that, if there is no voluntary activity by the agents, especially if proposed arrangements are rejected, the potential for efficient Pareto gains does not existent. In addition, high transaction costs may prevent it, as well as any other reason.

For Stigler (1974), in a wide range of situations, individuals shall fail to participate in collective profitable activities without coercion or individual incentives. On the other hand, O'Neill (2010) claims that there are considerable economic reasons for not accepting coercive "solutions" to any alleged inefficiency problem arising from a "ride".

Considering that there is no coercion under an entrepreneurial arrangement, it includes the assurance that all parties shall enjoy *ex ante*[7] gains, which is not the case under a coercive arrangement. It is not reasonable to assume that the regulatory agent shall develop arrangements with efficient Pareto gains better than the agents that benefit from the fruits of these arrangements. Based on arguments from the Theory of Public Choice [8]- without mentioning our actual experiences with the state supply of goods and services - there are strong reasons to believe that somebody shall be harmed (O'Neill, 2010).

It is argued that, if all agents can enjoy the gains, there is no reason for coercion and, therefore, an entrepreneurial solution is expected - that is, not a coercive one. Those defending the coercion as a means of resolving the "problem" of positive externalities make a basic economic misconception by disregarding the preferences of the agents involved, besides adopting the policy of "forcibly paying for unsolicited goods and service requests" as an ideal of

[6] In a gain of Efficient Pareto at least one person improves their situation and no one worse them as a result thereof (O'Neill, 2010).
[7] In economics, the term indicates what economic agents desire or expect (Simonsen & Cysne, 2009).
[8] A branch of economic theory where economic concepts are applied to public policy and services. With the motto that "people are people" - subject to the same motivations both in public and private lives - public choice addresses politicians (regulators) as human agentes, who prioritize meeting their self-interest rather than the common good (Tullock, Seldon & Brady, 2002).

economic development. For the author, this is indeed one of the most conspicuously tyrannical ideals of modern economics (O'Neill, 2010).

2.3.3 Review of research literature on free-riding

When analysing how free-riding behaviour in customer service affects competition, *Shin (2007)* found that free-riding actually harms the retailer offering the service. In contrast, when customers are heterogeneous as to opportunity costs for consuming, free-riding behaviour not only benefits the free-riding retailer, but also the retailer providing the pre-sale service.

On the other hand, free-riding consumers are also identified, “taking a ride” when a company can neither charge for a pre-sale information service nor distinguish opportunistic consumers from others (Carlton & Chevalier, 2001).

The literature points out that there is in e-commerce a tendency to free-riding behaviour, which is when the consumer searches for information about a certain product on a more complete website and, after gathering information, searches for other websites that offer the same product at a lower price (Van Baal & Dach, 2005; Spahn, 2013; Dias, 2014).

Ceribeli and Conte (2016) found some factors that motivate the adoption of e-commerce and directly influence the adoption of the free-riding behaviour, among them: (1) the possibility of lower prices in Internet purchases; (2) convenience in online purchases; (3) low risk of e-commerce; and (4) a pre-disposition to seek more prior information on social networks.

In the traditional retail (physical stores), free-riding behaviour occurs when a potential buyer physically evaluates a product and collects relevant information about the product and its applicability, but purchases it from another physical store or website that offers some advantage, such as better prices and payment conditions (Bakos, 2001).

3 METHODOLOGY

3.1 Research strategy

This work can be characterized as a documentary and exploratory research, which comprises data collected through the regulations of promotional Christmas campaigns of 2016, in two shopping centres selected for the research. Two questionnaire models were used as instruments of data collection. In addition, bibliographic research was carried out on the topics addressed hereunder.

3.2 Sample and description of population

Stores/kiosks in two shopping centres in the city of Ribeirão Preto (SP) were selected as study population to verify if the free-riding effect occurred during Christmas 2016 promotional sales campaign. In this sense, convenience sampling can be considered non-probabilistic, given its operational simplicity, inaccessibility and non-availability of all respondents in the population. Participating and non-participating stores/kiosks in the shopping mall sales campaign, during 2016 Christmas season, were the subject of investigation. Table 1 details the population:

Table 1
Population

Shopping Centre	A	%	B	%	Sample	%
Participants	68	80.95%	292	90.12%	360	88.24%
Non-participants	16	19%	32	9.88%	48	11.76%
Total	84	100%	324	100%	408	100%

Source: prepared by the authors (2017).

Approximately 25% of stores and kiosks were selected for the application of the questionnaire and sample selection, due to the limitations for data collection and acceptance in collaborating with the research. According to Table 3, the sample in Shopping Centre A comprised 19 stores/kiosks participating and 3 not participating of the promotional sales campaign in the Christmas Season of 2016; the sample in Shopping Centre B was 76 participating and 8 non-participating stores/kiosks. Considering all store /kiosks of the two shopping centres, the total sample of participants was 89.62%, while the total sample of non-participants was 10.38%

3.3 Procedures

In the studied environment, it was sought to: (1) identify the regulatory, regulated and unregulated agents, as well as free-riders; (2) identify costs and requirements for shopping centre stores to participate in the promotional campaign during Christmas season; (3) analyse the regulation of the promotional campaign; (4) verify if there were benefits, as well as other possible intangible gains, due to the promotional campaign for participating and non-participating stores / kiosks.

3.4 Data collection instrument

Data collection was carried out in the second half of January 2017, a period following the Christmas campaigns. Two assisted questionnaires[9] were used with store/kiosks managers who agreed to participate in the survey in order to verify whether there were benefits for the participating and non-participating stores in the promotional campaign.

Questionnaires were applied to: (1) stores/kiosks participating in the 2016 Christmas promotion and (2) stores/kiosks not participating in the 2016 Christmas promotion. Eleven questions based on the theoretical framework previously raised were included in the data collection instruments.

The first question is opened and aims to identify in which shopping centre the store/kiosk was located. Questions 2 through 6 are closed, as well as questions 8 through 10, which are multiple choice with the following objectives: identifying the benefits as well as other possible intangible gains; check for limitations; identify the costs and requirements for shopping centre stores/kiosks to participate in the regulation. Question 7 is opened and aims to capture the percentage (%) of sales increase related to the period of the Christmas campaign. Question 11 is also open and the respondent has the option to add some additional information deemed relevant.

3.5 Data processing

After collection, data were grouped and tabulated in a spreadsheet where the information provided by the respondents was identified and categorized. Using an ordinal scale[10], the answers were ordered according to the percentage of choice by the respondents.

4 PRESENTATION AND ANALYSIS OF RESULTS

The regulation taken as object of investigation hereof is a Christmas promotional campaign aimed at shopping mall customers. When consuming goods and services under the conditions established, these customers earn coupons for participation in a drawing or cash awards. For the economic group of Shopping Centre tenants, the common factors of interest are the incentive to consumption in the shopping centre environment and its self-benefit.

Primarily, this research sought to obtain access to the regulations of the sample promotions, which are divided into two types: internal (for stores/kiosks) and external (for customers) regulations. It is worth noting that, despite the efforts made, only the latter (external regulation) was available to the research.

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[9] Prepared based on the procedures proposed by this research (attachments A and B). The use of two questionnaires is due to the need for adaptations on certain questions to capture different points of view (participants and non-participants). Therefore, the questionnaire in attachment A was applied in all stores/kiosks participating in the promotion of their respective shopping centres; while the questionnaire in attachment B applied in all stores/kiosks not participating in the promotion of their respective shopping centres. The assisted questionnaire allows the researcher to directly follow up and coordinate the questions to respondents, besides avoiding incomplete information.

[10] The ordinal scale is one of the possibilities of measuring the facts to be investigated and indicates the relative position of the response with respect to some characteristic (Marconi & Lakatos, 1999, p. 117).

Based on the regulations provided and the application of the assisted questionnaires[11], the promotional campaign was analysed according to the items for the participation of stores/kiosks, as shown in Table 2:

Table 2
Promotional campaigns

Shopping centre	A	B
2016 Christmas Campaign	According to the current law[1]	According to the current law[1]
Place	Ribeirão Preto – SP	Ribeirão Preto – SP
Period	Between 24/11 to 26/12/16	Between 23/11/16 and 02/01/17
Promotional advertising	Internet, including social networks, website, banners, external media with billboard, flyer, press consultancy and gates at the Shopping centre, and maybe TV.	*Billboard*, *banner*, TV, radio, internet and internal communication.
Prerequisites	Partnership with the participating carrier[2]	Partnership with the participating carrier[2]
Limiting Factors	Stores/kiosks that transacts only uncovered goods and services[3]	Stores/kiosks that transacts only uncovered goods and services[3;4]

Note.[1] Law no. 5768/71, regulated by Decree no. 70.951/72 and MF Ordinance no. 41/08.
[2] Allow payments of purchases made under the conditions established, with the participating cards, in credit, debit and/or prepaid functions, exclusively transacted on the machine of the participating operator.
[3] Weapons, ammunition, explosives, fireworks, drugs, alcoholic beverages, tobacco and derivate thereof; cinema and theatre tickets (Art. 10 and 13 of Decree no. 70.951/72); parking, banking, exchange and lottery services.
[4] Tickets of concerts in the Event Centre (Art. 10 and 13 of Decree no. 70.951/72); electronic games.
Source: prepared by the authors (2017).

The agents of the relationship were identified between: (1) regulatory agent: Shopkeepers' Association of the Promotion Fund of Shopping Centre A and B; (2) regulated agent: participating stores/kiosks, that is, those that fall within the requirements of the regulation; and (3) unregulated agents: non-participating stores/kiosks, that is, those that did not meet the requirements of the regulation for participating, or those that were included but chose not to participate. Table 3 shows these agents and an indicative of the research sample.

Table 3
Agents

Shopping Centre	A	%	B	%	Total	%
Regulatory agents	1	-	1	-	2	-
Regulated agents	19	86.36%	76	90.48%	95	89.62%
Unregulated agents	3	13.64%	8	9.52%	11	10.38%
Total	22	100%	84	100%	106	100%

Source: prepared by the authors (2017).

It is worth noting the low representativeness among unregulated agents of the sample in both shopping centres, which is explained by the previous presence of low representativeness of the same agents in the study population. Thus, this scenario in the population is transferred to the sample. In short, few shops/kiosks have not opt to participate in the promotion of their shopping centres.

The main benefits of the regulation indicated by the agents were: increased sales, advertising and reputation gains, as shown in Table 4.

[11] The research tools contain sensitive information and, therefore, the entities contributing to the study are not identified.

Table 4
Benefits of regulation

	A			B			TOTAL SAMPLE (A+B)		
	Part.	Non-part.	Total	Part.	Non-part.	Total	Part.	Non-part.	Total
Advertising	42.11%	66.67%	45.45%	56.58%	50.00%	55.95%	53.68%	54.55%	53.77%
Reputation gains	26.32%	66.67%	31.82%	21.05%	12.50%	20.24%	22.11%	27.27%	22.64%
Increased sales	78.95%	66.67%	77.27%	90.79%	50.00%	86.90%	88.42%	54.55%	84.91%
Competitive advantage	10.53%	0.00%	9.09%	6.58%	12.50%	7.14%	7.37%	9.09%	7.55%
No benefit	0.00%	0.00%	0.00%	3.95%	25.00%	5.95%	3.16%	18.18%	4.72%
Other benefits[1]	10.53%	0.00%	9.09%	2.63%	0.00%	2.38%	4.21%	0.00%	3.77%

Note. [1] Increased flow of people in the shopping centre and potential customers in the store/kiosk, worth mentioning that it does not necessarily implies increased sales; drawing for awards for store/kiosk employees.
Source: prepared by the authors (2017).

All of the benefits listed on Table 4 are in line with the responses of the store/kiosk managers who answered the questionnaires. The indices represent total percentages of stores / kiosks that benefited from each benefit – regarding the number of users within the sample and not at benefit level.

It was found that, none of the benefits usually proposed by a regulation - subsidy, control over the entry of new competitors (entry barriers), pricing, power on complementary and replacement items (Stigler, 1971) - were found.

Regarding the main benefit obtained by the agents, Table 5 shows that the percentage of maximum increased sales of participating and non-participating stores/kiosks ranged from 70 to 200%; while no variation was observed in the minimum increased sales. The 0% index is persistent and is a result of the disbelief on the potential to increase sales and promote some stores/kiosks.

Table 5
Increased sales

	A			B			TOTAL SAMPLE (A+B)		
Increased sales (%)	Part.	Non-part.	Total	Part.	Non-part.	Total	Part.	Non-part.	Total
Minimum value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum value	90.00	80.00	90.00	200.00	70.00	200.00	200.00	80.00	200.00
Mean	31.58	36.67	32.27	30.80	21.50	29.92	30.96	25.64	30.41
Standard deviation	27.59	40.41	28.48	29.48	29.78	29.46	28.97	31.58	29.14

Source: prepared by the authors (2017).

The increased sale is in terms of billing (R$), as a percentage (%). This variable excludes the natural increased sales due to the Christmas. Since it was not possible to access the financial and accounting data of stores/kiosks, sales increase values were estimated by the managers who answered to the questionnaire.

As usual to regulations, the intervention entails administrative costs and fees. In both shopping centres, these costs are included in the Advertising Fund of the Condominium of the Shopping Centre administration, which are monthly charged from all stores/kiosks and twice during the months of major campaigns (Christmas and Mother's Day), in addition to other burdens. As to the information on how costs are distributed, it has not been disclosed.

Given the foregoing, said benefits were classified as a mixture of public and private goods, as they have both characteristics: contribution with administrative costs and fees imposed on all by the regulatory body (public good) and non-participation of some members of the economic group (private good).

Thus, as expected according to the assumptions hereof, the results indicate the existence of extra agents in the intervention: free-riders[12], that is, unregulated stores/kiosks that, despite the non-participation, enjoyed one or more benefits of the promotion. Thus, Table 3 can be redisplayed as follows (Table 6):

Table 6
Agents (II)

Shopping Centre	A	%	B	%	Total	%
Regulatory agent	1	-	1	-	2	-
Regulated agent	19	86.36%	76	90.48%	95	89.62%
Unregulated agent	3	13.64%	8	9.52%	11	10.38%
Free-riders	3	13.64%	5	5.95%	8	7.55%
Total	22	100%	84	100%	106	100%

Source: prepared by the authors (2017).

It is worth emphasizing that not all unregulated agents were identified as free riders, since 3 out of 8 unregulated agents in Shopping Centre B showed not to have enjoyed the benefits. Thus, despite the rational tendency to such, not all agents desire or succeed in acting opportunistically (Albanese & Van Fleet, 1985).

However, it should be highlighted that although not all regulated agents in Shopping Centre B are classified as free riders, the effect is still present. With that in mind, it can be observed that the free-riding effect occurs between participating (regulated agents) and non-participants (unregulated) stores/kiosks in both shopping centres.

As previously stated, it was also not possible to assess the form of distributing the intervention's administrative costs and fees, however, these were assumed to have been equally distributed among all. If the hypothesis is true, it is possible to consider the occurrence of the free-riding effect among the participants of the regulation, since some enjoyed greater benefits than the average making the same contribution.

5 CONCLUSIONS

In view of the Economic Theory of Regulation and other principles and propositions related to the literature hereunder, this study aimed to understand the regulation model and the impacts thereof, detecting the presence or absence of free-riding effect in a shopping centre environment in the Christmas season of 2016, during promotional sales campaign. Free-riding may jeopardize the common welfare of the economic group, which can be seen as a problem and lead to the search for coercive or entrepreneurial solutions.

This research used the enjoyment of benefits arising from promotional campaigns by unregulated stores and kiosks as a proxy for the free-riding effect. Moreover, other elements in the regulation and in the questionnaire applied through interview were considered hereunder.

The results show that the free-riding effect exists in the shopping centre environment, in the Christmas season of 2016, during a promotional sales campaign, among participating and non-participating stores/kiosks. Although the regulation seeks to establish an entrance barrier for those who are not members of the group of interest, this is not always entirely possible, resulting in the occasional appearance of free-riders. That is, it was possible to find evidence of the use of the benefits from the regulation by stores/kiosks not participating in the regulation. Therefore, free-riding can occur in a shopping centre environment, in the Christmas season of 2016, during a promotional sales campaign.

Regarding the effect between the participating stores/kiosks, it is not possible to assure its occurrence. The lack of knowledge on how the intervention costs are distributed and the lack of access to other information make the assessment difficult. However, following the hypothesis of an equal contribution for all, it is considered likely the existence of the studied effect.

[12] The term more accurate term to define the condition is "cheap rider" (Stigler, 1974) - since his ride is not purely free, given existing compulsory contribution of all with the costs. However, free-rider, the more common term, is herein adopted (Albanese & Van Fleet, 1985).

The impacts of free-riding are identified as motivating or demotivating factors for participating in the regulation in question, as a result of incentives and disincentives to free-ride (Albanese & Van Fleet, 1985), in addition to negatively interfering with the common well-being of the group.

Although the costs are compulsory, some stores/kiosks opted for the non-participation, although they complied with the rules. Among the reasons were: the parent company (main decision maker) did not consent, expiration of the deadline for adherence to regulation and lack of interest driven by the absence of apparent benefit.

Moreover, most respondents showed to be unaware of the consolidated “free-rider” concept, showing a more "unconscious" or "superficial" form of the concept. If the free-rider problem exists, the search for solutions becomes more difficult, especially for entrepreneurs, since the members of this group are the best at proposing them (O'Neill, 2010).

However, the proposed solution is coercive in both shopping centres, that is, the payment of intervention costs is compulsory, imposed by regulatory agencies. This arrangement does not reach the peak of the common welfare of the group, since not everyone can enjoy the benefit, and the effect goes on.

Therefore, in order to minimize the asymmetry that stimulates the free-riding, it is suggested to explore an entrepreneurial solution jointly prepared by the economic group; the participation of the regulatory bodies may be interesting.

It is worth mentioning that, added to the challenge of finding the problem solving arrangement, in agreement with the findings by Stigler (1971), there is still a more primary complexity of regulation: to find out when and why a group is able to use the regulatory agent for its own purposes or is indicated by the regulatory agent to be used for other purposes. Thus, the matter is not as simple as it seems.

Moreover, the study admits that certain limitations should be taken into account, such as: sample size, number of events and period used, that is, sample, events and relatively small periods when compared to the total. This restriction partly is due to the complexity of obtaining information held as confidential by the entities involved. Furthermore, the variables comprise intangible aspects or aspects of difficult assessment, which impairs the overall analysis. Another limitation is the lack of studies on the matter, as well as researches with application of the Economic Theory of Regulation under different perspectives of Politics and Public Power.

Fiani (2004, 81) also points out difficulties regarding the matter:

> The most relevant models of the economic theory of regulation are critically reviewed in this work, pointing out the inconsistencies between the theoretical results and the lack of empirical support of decisive character for these models, stressing the need of considering the autonomy of the regulator before the groups of interest and the institutional context.

We suggest that future research increase the sample size, the number of events and the period used, besides applying another methodology to compare results. Similar to the proposal of this work, others may approach other areas in order to extrapolate the application of the economic theory of regulation, fundamentally focused on the intervention of the State in the economy, in order to better understand the dynamics of the free-riding effect and other subjects in more specific scenarios.

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ATTACHMENT A – Questionnaire Model: Participating Shops/kiosks

Participantes da promoção de Natal 2016

*Obrigatório

1. **Informe o nome do shopping da promoção.** *

2. **Quais foram os pré-requisitos para participar da regulação (promoção)?** *
Marque todas que se aplicam.
- [ ] Tempo de casa
- [ ] Tamanho de loja/quiosque
- [ ] Faturamento
- [ ] Não existiram pré-requisitos.
- [ ] Outro:

3. **Existiu alguma fator limitante às lojas/quiosques para participar?** *
Marque todas que se aplicam.
- [ ] Ser estabelecimento do próprio shopping
- [ ] Ser estabelecimento estritamente de serviços
- [ ] Não existiram fatores limitantes.
- [ ] Outro:

4. **Houve algum custo ou taxa administrativa para participação?** *
Marcar apenas uma oval.
- ( ) O(s) prêmio(s) e demais custos foram rateados (divididos) entre os participantes.
- ( ) Os custos já estavam inclusos no valor de locação do estabelecimento.
- ( ) Somente uma taxa administrativa.
- ( ) Nenhum custo.
- ( ) Outro:

5. **Dos benefícios geralmente propostos por uma regulação (promoção), quais foram oferecidos?** *
Marque todas que se aplicam.
- [ ] Subsídio
- [ ] Controle sobre entrada de novos concorrentes (barreira de entrada)
- [ ] Fixação de preços
- [ ] Poder sobre itens substitutos e complementares
- [ ] Nenhuma das alternativas anteriores.

6. **Algum outro benefício foi gerado pela regulação (promoção)?** *
Marque todas que se aplicam.
- [ ] Publicidade e propaganda
- [ ] Ganho de reputação positiva
- [ ] Aumento de vendas/faturamento
- [ ] Vantagem competitiva
- [ ] Nenhuma das alternativas anteriores.
- [ ] Outro:

7. **Acredita que a regulação gerou quantos % de ganhos adicionais?** *
Responda a pergunta isolando-se o aumento de vendas/faturamento natural devido ao período de Natal.
Marcar apenas uma oval.
- ( ) .... %

8. **Acredita que a promoção beneficia a:** *
Marcar apenas uma oval.
- ( ) Somente lojas/quiosques participantes
- ( ) Somente lojas/quiosques NÃO participantes
- ( ) Todas as lojas/quiosques (participantes e não participantes)
- ( ) Nenhuma das lojas/quiosques (participantes e não participantes)
- ( ) Outro:

9. **Acredita que existiu efeito carona (free-riding) na regulação em questão?** *
Segundo Albanase e Van Fleet (1985), o efeito free-riding - ou efeito carona - é definido como a atuação em que um membro de um grupo obtém benefícios da membresia do grupo, porém não suporta um compartilhamento proporcional dos custos de prover tais benefícios.
Marcar apenas uma oval.
- ( ) Sim, dentre os participantes.
- ( ) Sim, entre participantes e não participantes.
- ( ) Todas as alternativas anteriores.
- ( ) Nenhuma das alternativas. Não houve efeito carona (free-riding).

10. **Como participante, por qual(is) motivo(s) participou da promoção?** *
Marque todas que se aplicam.
- [ ] Baixo ou nenhum custo
- [ ] Especial aumento de vendas
- [ ] Outros benefícios tangíveis e intangíveis
- [ ] Ausência de efeito carona (free-riding)
- [ ] Outro:

11. **Se deseja fornecer alguma informação adicional, por favor deixe-a abaixo.** *

ATTACHMENT B – Questionnaire Model: Non-participating Shops/kiosks

Não participantes da promoção de Natal 2016

*Obrigatório

1. **Informe o nome do shopping da promoção.** *

2. **Algum pré-requisito impediu sua participação na regulação (promoção)?** *
Marque todas que se aplicam.
- [ ] Tempo de casa
- [ ] Tamanho de loja/quiosque
- [ ] Faturamento
- [ ] Não existiram pré-requisitos.
- [ ] Outro:

3. **Existiu alguma outro fator limitante para sua participação?** *
Marque todas que se aplicam.
- [ ] Ser estabelecimento do próprio shopping
- [ ] Ser estabelecimento estritamente de serviços
- [ ] Não existiram fatores limitantes.
- [ ] Outro:

4. **Havia algum custo ou taxa administrativa para participação?** *
Marcar apenas uma oval.
- ( ) O(s) prêmio(s) da promoção e demais custos foram rateados (divididos) entre os participantes.
- ( ) Os custos já estavam inclusos no valor de locação usuais do espaço do estabelecimento.
- ( ) Somente uma taxa administrativa.
- ( ) Nenhum custo.
- ( ) Outro:

5. **Dos benefícios geralmente propostos por uma regulação (promoção), quais foram oferecidos?** *
Marque todas que se aplicam.
- [ ] Subsídio
- [ ] Controle sobre entrada de novos concorrentes (barreira de entrada)
- [ ] Fixação de preços
- [ ] Poder sobre itens substitutos e complementares
- [ ] Nenhuma das alternativas anteriores.

6. **Algum outro benefício poderia ser gerado pela regulação (promoção)?** *
Marque todas que se aplicam.
- [ ] Publicidade e propaganda
- [ ] Ganho de reputação positiva
- [ ] Aumento de vendas/faturamento
- [ ] Vantagem competitiva
- [ ] Nenhuma das alternativas anteriores.
- [ ] Outro:

7. **Acredita que a regulação gerou quantos % de ganhos adicionais?** *
Responda a pergunta isolando-se o aumento de vendas/faturamento natural devido ao período de Natal.
Marcar apenas uma oval.
- ( ) .... %

8. **Acredita que a promoção beneficia a:** *
Marcar apenas uma oval.
- ( ) Somente lojas/quiosques participantes
- ( ) Somente lojas/quiosques NÃO participantes
- ( ) Todas as lojas/quiosques (participantes e não participantes)
- ( ) Nenhuma das lojas/quiosques (participantes e não participantes)
- ( ) Outro:

9. **Acredita que existiu efeito carona (free-riding) na regulação em questão?** *
Segundo Albanase e Van Fleet (1985), o efeito free-riding - ou efeito carona - é definido como a atuação em que um membro de um grupo obtém benefícios da membresia do grupo, porém não suporta um compartilhamento proporcional dos custos de prover tais benefícios.
Marcar apenas uma oval.
- ( ) Sim, dentre os participantes.
- ( ) Sim, entre participantes e não participantes.
- ( ) Todas as alternativas anteriores.
- ( ) Nenhuma das alternativas. Não houve efeito carona (free-riding).

10. **Como não participante, por qual(is) motivo(s) não participou da promoção?** *
Marque todas que se aplicam.
- [ ] Custos
- [ ] Pouco ou nenhum benefício
- [ ] Não cumprimento dos pré-requisitos e/ou restrições (fatores limitantes) para participação
- [ ] Efeito carona (free-riding)
- [ ] Outro:

11. **Se deseja fornecer alguma informação adicional, por favor deixe-a abaixo.**

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RELATIONSHIP OF PROFITABILITY AND DISCLOSURE OF PROVISIONS AND CONTINGENT LIABILITIES OF HIGH POLLUTION POTENTIAL COMPANIES LISTED ON B3

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ABSTRACT

The present study aims to analyze the relationship between the profitability and the disclosure of environmental contingent provisions and liabilities of the companies with high potential for pollution listed in B3. The research sample consists of 38 companies of shares traded in B3, which makes up the high-impact group, according to Law No. 10,165 / 2000, which deals with the National Environmental Policy. In order to achieve the objective of this research, we used the content analysis to examine the disclosure of environmental contingent provisions and liabilities by companies, in the period from 2011 to 2016, as well as the application of multiple regression of fixed effect. The result presented statistical significance between the independent variable Profitability (RENT) and disclosure, but with a negative coefficient, that is, the most profitable companies are not necessarily the ones that most disclose information on environmental contingent provisions and liabilities. Thus, there was a rejection of the research hypothesis (H1: The profitability of companies with high polluting potential is positively related to the disclosure of provisions and contingent environmental liabilities). Such a result runs counter to the argument that most profitable firms tend to disclose more information than less profitable ones, just to differentiate themselves from them. Regarding the other variables, Market Value and Business Sustainability Index (ISE), these were significant and negative, while Indebtedness was positive; Size was not significant, and finally, Corporate Governance was omitted from the econometric model because it was a fixed dummy along the panel.

Keywords: Disclosure. Provisions and Contingent Liabilities. High Pollution Potential. Profitability.

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1 INTRODUCTION

As of the Industrial Revolution, problems started to repetitively affect the environment, reducing natural resources and promoting climate changes resulted from the pollution of rivers, the air and the soil. Therefore, organizational strategies started being developed aimed to combine action of social responsibility, sustainable development, consumer awareness while achieving company's goals (Souza, Rásia, & Jacques, 2010).

These strategies aim at obtaining image gains and financial advantages, such as the valuation of shares and better economic and financial performance (Kolk, Levy, & Pinkse, 2008), since the good environmental image for organizations, especially those in sectors of high risk of environmental accidents, has gained importance over time (Nossa, 2002).

According to Law no. 10.165/2000, addressing the National Environmental Policy, the activities developed by the entities are categorized according to the level of pollution, and the use of natural resources, whose impact may be classified as small, medium and high polluting (Vieira, Arruda, & Lima, 2014). It is expected, therefore, that organizations with a high polluting impact disclose more environmental information than those that do not carry out potentially polluting activities (Pereira, Bruni, & Dias, 2010). Through the information disclosed, it is possible to know the risks and uncertainties inherent to the activities of the organizations to subsequently contribute to the decision-making process of the agents (Bomfim, Teixeira, & Monte, 2015).

In Brazil there is no specific law that forces companies to disclose social/environmental information, but many companies has adopted these practices mainly to demonstrate environmental concern and social responsibility. In addition, environmental information can directly or indirectly affect the economic/financial situation of companies, (Santos, 2016).

As for environmental accounting information, there are environmental contingent provisions and liabilities, which came into effect with CPC 25 - Provisions, Contingent Liabilities and Contingent Assets, issued in 2009. This pronouncement defines contingent liabilities as present obligation of the entity resulting from past events, the settlement of which shall result in an outflow of resources capable of generating economic benefits. These contingent liabilities are related to labor, tax, civil and environmental matters.

According to Bewley (1998), there is a positive relationship between the disclosure of contingent provision and liabilities and the market value of companies. However, the literature is controversial as to the stock market reaction to the disclosure of environmental information in the financial report. On the other hand, Bushman and Smith (2001) complement that the transparency of the accounting information is an important tool for a company to stand out among competitors; therefore, contingent provisions and liabilities are likely to be disclosed in the financial statements, provided there is an economic gain.

In this sense, there are two lines of thinking. The first, so called traditional, defends that initiatives aimed at improving environmental performance implies in high costs for the companies, thus contributing to declining their financial performance. Contrary to current trends, these initiatives contribute to increase efficiency and improve the company's image before its stakeholders, which can be an authentic and competitive factor that leads to better financial performance (Roque & Cortez, 2006).

Porter (1991) and Porter and Van Der Linde (1995) introduce the Porter Hypothesis (PH), which argues that when environmental regulation is well done, it will benefit both the environment and the company, since environmental preservation aims to increase the productivity of the resources used in the production and, consequently, to increase competitiveness of companies. Nossa (2002) further mentions that the agents disclose the environmental actions of the company for the less informed parties so as to reduce asymmetric information and increase the credibility of the company.

Given the foregoing, and considering that companies are constantly under pressure to demonstrate a satisfactory performance in the environmental scope, placing the social responsibility as one of the mechanisms by which they seek to meet this requirement, and the corporate environmental disclosure as an important measure to influence external perceptions about the company, aiming to improve its economic performance; the objective of this work is to analyze the relationship between profitability and the disclosure of environmental contingent provisions and liabilities of high polluting companies listed on B3.

This research is justified by the importance of disclosing environmental information of high polluting companies listed in B3, as to contingent provisions and liabilities, as directed by CPC 25. This demonstrates the position of large organizations in providing users with important information, presenting their risks to the market, sharing with society the general risks inherent in their activities. The study is also justified by the relevance of the topic in the context of global competitiveness among companies, since the market gives greater credibility to such companies, stimulating investors' interest (Fernandes, 2013).

Moreover, although there are several studies on voluntary environmental disclosure, the context dealing with environmental contingent provisions and liabilities is poorly explored in national surveys. One of the main reasons for this lack of interest is this is nota n obligatory information; In addition, managers are careful when providing information that may lead stakeholders to distrust investing in companies that are more prone to environmental risks.

2 THEORETICAL FOUNDATION

2.1 Discretionary Disclosure Theory

Disclosure is the announcement of information about entities that aims to meet the needs of the most varied types of external users of accounting information, as well as to comply with legislation. Finally, there are the discretionary disclosures.

According to Verrecchia (2001), the discretionary disclosure of information may be based on three categories of research: (1) association-based disclosure research; (2) judgment-based disclosure research; and (3) research on efficiency-based disclosure. The first category aims to investigate the effects of disclosure on the actions of individuals, such as investors; the second category detects the reasons for the disclosure of certain information of the entity; while the third and last category, according to the author, contains research on which disclosures are preferable in the lack of prior knowledge of some information.

Accordingly, Dye (2001) states that there is no theory of discretionary disclosure, which is classified by the author as a special case of the theory of games, under the following perspective: entities shall only disclose their information that favors them, not publishing those that are disadvantageous. The theory of games assumes that there may be certain outcomes, based on which players, in this case the entities, choose premeditated actions to improve their return, achieving the expected goal.

Dantas, Zendersky, Santos and Niyama (2005) claims that a balance shall be reached between the cost and benefit of disseminating information; disadvantages should not outweigh the advantages. Thus, an entity with satisfactory results in the social/economic and environmental contexts, or that considers itself capable of achieving them, shall have more incentive to voluntarily disclose the information, as the advantages compensate the costs.

However, for an entity that assumes poor performance, non-disclosure may be the safest path; Otherwise, the company may damage both its reputation and that of its manager (Dantas et al., 2005). Verrecchia (2001) points out that, in a context where there are no disclosure costs, entities need to voluntarily expose information, as the market may negatively perceive non-disclosure.

In any case, the more information is disclosed by entities, the less information are exclusive and, therefore, confidential. Thus managers shall have reduced chances of gaining their own benefits for the knowledge they have. Uyar and Kiliç (2012) argue that the more discretionary information is disclosed by companies, the greater the users' understanding of its value.

2.2 Environmental contingent provisions and liabilities

According to Brazilian accounting standards, the publication of environmental information is not mandatory. However, recommendations for the disclosure of provisions contingent assets and liabilities applicable to environmental matters, issued as of CVM Resolution no. 594, dated September 15, 2009, which makes mandatory the application of CPC

25 by publicly-held companies, as of the financial year of 2010 (Martins, Gelbcke, Santos, & Iudícibus, 2013).

CPC 25 requires disclosure of both quantitative and qualitative information on provisions and contingencies (Baldoino & Borba, 2015). On this, Dantas et al. (2005) note a certain similarity between the scope of disclosure and the definition of transparency; However, they point out that the concept of disclosure goes beyond the simple act of disclosure, also covering other factors such as quality, timeliness and clarity, which allows users to evaluate business aspects such as financial condition, business performance, etc.

O CPC pronouncement 25 requires the disclosure both of quantitative and qualitative information on provisions and contingencies (Baldoino & Borba, 2015). On this regard, Dantas et al. (2005) note some similarity between the scope of the disclosure and the definition of transparency; highlighting, however, that the concept of disclosure is not limited to the disclosure, also encompassing other factors such as quality, opportunity and clarity, which allows users to evaluate business aspects such as financial condition, business performance, etc.

With that in mind, the disclosure of contingent liabilities in the financial statements with explanatory notes is essential for users to obtain useful and reliable information to assist them in the decision-making (Caetano, Silva, Biesdorf, & Leal, 2010). For this purpose, CPC 25 aims to ensure that its recognition and measurement criteria are properly used, as well as to ensure clear information in explanatory notes that enable their users to understand the nature, timing and value of the elements (Oliveira, Benetti, & Varela, 2011).

In general, all provisions are contingent, as their term or value is uncertain. However, CPC 25 states that the term "contingent" is used for liabilities and assets that are not recognized because their existence is only confirmed by the occurrence or not of one or more uncertain future events, not entirely under the control of the entity. In addition, the term contingent liability is used for liabilities that do not meet the recognition criteria (Martins et al., 2013).

The recognition of environmental contingent liabilities, according to CPC 25, presents two types of obligations: (1) the non-formalized and (2) the legal obligation. The non-formalized obligation arises from the company's actions when the event makes it possible to settle certain responsibilities before third parties. According to the author, the company may be obliged to repair some damage caused to the environment; the company, on the other hand, agrees to repair it by considering the possibility that, in the future, this will become a legal obligation, either by ethical principles or by adherence to practices and policies for such procedure. The legal obligation, on the other hand, arises from legislation or contracts when, for example, there are penalties or cost generation for the company, as in the recovery of environmental areas affected by the company’s actions or in the decontaminations of rivers (Leal, Costa, Oliveira, & Rebouças, 2015).

CPC 25 states that if there is a liability whose amount is safely measurable, it must be provided. If there is only the possibility that such liability exists, it shall be disclosed as a contingent liability. Where the existence of the liability and the outflow of resources for possible settlement are very small (remote), nothing shall be disclosed.

As regards environmental contingent provisions and liabilities, entities must disclose, where applicable, the items required by CPC 25, which, although not directly related to the environmental scope, apply to all cases. If some items are not evidenced because the company does not practice them, the organization must disclose them, clarifying that this item is not applicable to the company’s reality. Murcia and Santos (2009) points out that, given the voluntary nature of the disclosure, entities are free to prepare the scope, period and how to disseminate this information to users.

According to Dye (2001), this disclosure is a special case of the game, whose main premise is that the entity shall only voluntarily disclose favorable information because of the positive effect on market players. The logic is that the benefits of disclosure must outweigh the costs incurred therein; otherwise companies shall not disclose it (Angonese, Sanches, & Bezerra, 2014; Cunha & Ribeiro, 2008).

Cunha and Ribeiro (2008), however, argue that "disclosure of information by accounting deserves special attention in the corporate discussion, as it is one of the most important ways managers can communicate with investors and the general market". Such narrative has survived over several decades, as discussed in the findings by Kennedy, Mitchell and Sefcik (1998), which state that the continuous values in the environmental contingent liabilities evidences impact of the stakeholder's analysis regarding both to the assimilation of investment risk and the decisions on the capital invested.

2.3 Previous studies

The focus of some research has been to verify the existence of a relationship between voluntary environmental disclosure and some factors that may explain the determining factors of this type of disclosure, as well as to analyze the impact of such disclosures, especially within the environmental scope and some financial and economic factors of the entities (such as market, profitability and size of organizations). These studies seek to relate some of these factors to disclosure practices, especially those with greater impact on the stakeholders.

The study conducted by Rufino and Machado (2015) sought to identify the determining factors of social voluntary disclosure of 100 companies listed on BM&FBovespa between 2010 and 2012. The results of this research showed that the return on equity, the size, the regulated sector and the entity's reputation were the most relevant reasons for voluntary social disclosure. It was also verified that external users could also influence voluntary disclosure.

On the other hand, Silva, Alexandre, Freitas & Silva (2014), in the same line of research, analyzed the financial statements of 2012 of 43 entities with high environmental impact, in accordance with Law no. 10.165/00. From the results found, the authors fund that the fact that organizations have a higher sales rate does not proportionally influence the increase in the amount of environmental disclosure, and those entities that are audited by the four largest auditing companies in the world, the Big Four, tend to disclose more than others that are not audited. Unlike the studies presented hereunder, this research found that profitability of companies does not influence the amount of disclosure.

Murcia and Santos (2009) and Angonese et al. (2014) studied the determining factors of voluntary disclosure in 100 non-financial corporations in 2007, and the factors that explain online voluntary disclosures. The authors disagreed in some points, but reached the same conclusion regarding profitability as a non-determining factor of the disclosure. They agreed that there is a statistical significance regarding size and corporate governance variables, and they differed in the auditory factor, since Murcia and Santos (2009) concluded that this point is insignificant in the determination of voluntary disclosure, while Angonese et al. (2014) demonstrated that the size of the audit firm is a determining factor for such disclosure, agreeing at this point with the study by Silva et al. (2014).

They agreed there is a statistical significance regarding size and corporate governance variables, and disagreed regarding the auditing factor, since Murcia and Santos (2009) found that this point is insignificant in assessing the voluntary disclosure, while Angonese et al. (2014) demonstrated that the size of the audit firm is a determining factor for such disclosure, in line with the study by Silva et al. (2014).

Regarding compliance with the requirements for the disclosure contingent of provisions and liabilities set forth in CPC 25, Suave, Codesso, Pinto, Vicente and Lunkes (2013) investigated whether the entities most traded on BM&FBovespa complied with this pronouncement. The results of the survey showed that organizations especially point out legal proceedings associated with tax, labor and civil matters, while environmental contingencies have a lower rate of disclosure. Regarding the items requested by CPC 25, it was found that companies mainly meet the description of nature, estimates of financial effects, inaccuracies regarding values and periods of occurrence, and measurement criteria. These authors have found that the entities do not disclose their information with the proper quality, as their reality was not demonstrated.

According to Akerlof (1970), the most profitable organizations tend to disclose more information in order to stand above the less profitable ones and, thus, reduce the risk of adverse selection. In line with the foregoing, Gray, Meek and Roberts (1995) state that the most profitable entities have incentives to stand above those with lower profitability, aiming to raise capital under the best available conditions, so they tend to disclose more information.

Lang and Lundholm (1993) states that most profitable companies can stand out among the less profitable ones by disclosing environmental information, communicating investors in the financial market of their environmental and showing an advantage over competitors.

Lu and Abeysekera (2014) investigated the influence of investors and the characteristics of social and environmental disclosure practices of Chinese companies considered to be socially responsible, identified by a classification list. After analyzing the reports, the authors verified that the variables profitability, company size and industry classification have statistically significant associations with social and environmental disclosure.

Fonteles, Nascimento, Ponte and Rebouças (2012) analyzed the determining factor of the disclosure of provisions and contingencies by the companies listed on the BM&FBovespa, and the results of the survey indicated a very low level of compliance: about 32% of the items required by CPC 25. As regards the determinants, the contingency disclosure index was found to be mainly motivated by the branches of electric energy, electronics, telecommunications, non-metallic minerals, trade and also by the size and profitability of the organizations, since these variables were statistically significant. The same did not happen with the variables liquidity and construction sector, which proved to be insignificant for the disclosure.

This study, in turn, follows the perspective that the discretionary disclosure of environmental contingent provisions and liabilities is directly associated with the profitability of high polluting companies.

2.4 Hypothesis formulation

Given the empirical evidences found, the general nature of studies suggests the existence of a positive relationship between the environmental and financial performance of companies (Stanwick & Stanwick, 1998, Gottsman & Kessler, 1998, Austin, Alberini, & Videras, 1999, Cohen, Fenn, & Konar, 1997).

Regarding the dissemination of environmental information, the Iatridis (2013) study found that the disclosure of environmental information is associated to the good performance of entities, especially in the chemical, paper and industry sectors, as well as in the metal and mining sectors, which are part of the group of high polluting companies.

Based on this assumption, this research is based on the Theory of Discretionary Disclosure (Verrecchia, 2001) to associate the disclosure of information on environmental risks and the profitability of companies. The expectation is that a positive relationship is found between the disclosure of provisions and contingent environmental liabilities and the profitability of high polluting companies listed in B3. Thus, the following hypothesis was tested:

H_1: The profitability of companies with high pollution potential is positively related to the disclosure of environmental contingent provisions and liabilities of the companies with high pollution potential listed in B3.

3 METHODOLOGY

This is a descriptive research, as the objective hereof is to describe the relationship between profitability and the disclosure of environmental contingent provisions and liabilities of companies with high pollution potential listed in B3 from 2011 to 2016. Regarding the approach problem, it is considered quantitative, since it has used statistical analysis instruments (Beuren & Raupp, 2006).

The definition of the variables in Table 1 was based on the works of Uyar and Kiliç (2012) and Leal et al. (2015). The collection of economic/financial information of the companies in the sample was conducted in the database of Economática®, which allows to verify information related to the economic/financial performance of the companies in their consolidated statements. The data were extracted from the B3 website, through documentary analysis of explanatory notes and sustainability reports, in order to build the variables: Disclosure of environmental contingent provisions and liabilities (DIVULG), Corporate Sustainability Index (ISE) and Corporate Governance (GOV).

Table 1
Research variables

Var.	**Type**	**Description**	**Calculation**	**Expected effect**	**References**
DIVULG	D	Disclosure of information on environmental contingent provisions and liabilities according to CPC 25.	(0) for companies that did not disclose, (1) for those that disclosed; afterwards, the total of elements is obtained and the proportion of the item disclosed is verified in relation to the total metrics		
RENT	I	Return on investment (ROA)	Net Income / Total Assets	+	Fonteles *et al.* (2012); Rufino and Machado (2015)
VM	C	Market value	Log of stock market value	+	Sousa, Silva, Ribeiro and Weffort (2014)
ENDIV	C	Indebtness	Total Liability /Net worth	+	Stulz (1990); Durand (1959)
ISE	C	Participation in ISE (*dummy*)	(0) for companies that do not belong to the ISE, (1) for those that belong	+	Rufino and Monte (2014)
GOV	C	Adherence to one of the levels of Corporate Governance (dummy)	(0) for companies that did not adhere to one of the KM levels, (1) for those who did	+	Leal and Silva (2005); Murcia and Santos (2009)
TAM	C	Company size	Natural Logarithm of Total Asset	+	Murcia and Santos (2009); Rufino and Monte (2014)

Note: Var. – variables; D – Dependent; I– Independent; C – Control; CPC – Accounting Pronouncements Committee; PL – Net worth; ISE – Business Sustainability Index; GOV – Corporate Governance.

Source: Adapted from Leal, P. H., Costa, B. M. N., Oliveira, M. C., & Rebouças, S. M. D. P. (2015). Disclosure of Environmental Contingent Provisions and Liabilities Under the Institutional Theory. Yearbook of the Congress of the National Association of Postgraduate Programs in Accounting Sciences, Curitiba, PR, Brazil, 9.

The DIVULG variable was measured according to the fulfillment of the requirements listed in Table 2. The procedure used assigned value 0 to those items that were not identified in the explanatory notes, and 1 to those that were disclosed by the companies. Subsequently, the proportion of the disclosed item was calculated in relation to the total metrics.

According to CPC 25 (2009), the company must disclose all information, except if an item is not mandatory; in which case the company shall justify why it is not applicable. Thus, each justified item shall be considered as information disclosed in the analysis of the explanatory notes (Leal et al., 2015).

Table 2
Items for the disclosure of contingent provisions and liabilities under CPC 25

Environmental provisions
Book value at the beginning and at the end of the period
Additional provisions made during the year, including an increase in existing provisions
Amounts used (that is, incurred and written off against provision) during the financial year
Amounts unused and reverted during the financial year
Brief description of the nature of the obligation
Expected timeline for outflows of economic benefits
Indication of uncertainties regarding the value or timeline for outflows of economic benefits
value of any expected reimbursement, declaring the value of any asset that has been recognized for said expected reimbursement
Environmental contingent liabilities
Brief description of the nature of the contingent liability
Estimated financial effect when practicable
Increase over the period in the discounted value to the present value arising from the lapse of time and the effect of any change on the discount rate
Uncertainties related to the value or moment of occurrence of any output when practicable
Possibility of any reimbursement where practicable

Source: Leal, P. H., Costa, B. M. N., Oliveira, M. C., & Rebouças, S. M. D. P. (2015). Disclosure of Environmental Contingent Provisions and Liabilities Under the Institutional Theory. Yearbook of the Congress of the National Association of Postgraduate Programs in Accounting Sciences, Curitiba, PR, Brazil, 9.

The population of this study comprises all companies with high pollution potential listed on B3 whose shares were traded in the period from 2011 to 2016. However, one of the 39 companies registered in this category was excluded because it did not have all the necessary information for measuring the variables applied in the research. Thus, the final sample comprised 38 companies, as shown in Table 3.

In order to determine if the companies had high pollution potential, attachment VIII of Law no. 10.165/2000, which addresses the National Environmental Policy, was used. This attachment classifies the economic activities of companies in small, medium and high environmental impact.

Table 3
Companies comprising the research sample

Pollution potential	**Sectors of Law no. 10.165/2000**	**Sectors of B3**	**Companies**
High	Extraction and treatment of minerals	Metallic minerals	Bradespar
			Litel
			MMX Mineração e Metalicos S.A.
			Vale S.A.
	Metallurgy	Artifacts of Iron and Steel	Fibam
			Mangels Indl
			Panatlantica
			Tekno
		Artifacts of Copper	Paranapanema
		Steel Industry	Ferbasa
			Gerdau
			Gerdau Met
			Sid Nacional
			Usiminas

Continue

Table 3 (continuation)

Pollution potential	Sectors of Law no. 10.165/2000	Sectors of B3	Companies
High	Pulp and Paper	Pulp and Paper	Celul Irani
			Firbia
			Klabin S/A
			Santher
			Suzano Hold
			Suzano Papel
	Chemical industry	Petrochemical	Brasken
			Elekeiroz
			GPC Part
		Fertilizers and Defensive	Fer Heringer
			Nutriplant
		Miscellaneous Chemicals	Cristal
			Unipar
	Transportation, terminals, warehouses and trade	Extraction, Refining and Distribution	CosanLtd
			Cosan
			Nova Oleo
			OGX Petroleo
			Pet Manguinh
			Petrobras
			Petrorio
			QGEP Part
			Ultrapar
		Equipment and services	Lupatech S.A
			OSX Brasil

Source: Santos, L. M. S. (2016). *Explanatory factors for the disclosure of environmental information of potentially polluting companies listed on BM&FBovespa. Master's Dissertation in Accounting Sciences, Federal University of Paraíba, João Pessoa, PB, Brazil*.

The period analyzed hereunder was from 2011 to 2016, since in 2010 CPC 25 was issued, however, the reflexes of its adoption could be identified in the following year. The objective of this Technical Pronouncement is to establish recognition criteria and measurement bases that are appropriate to provisions, liabilities and contingent assets. It further aims to disseminate sufficient information in the explanatory notes so as to allow users to understand its nature, opportunity and value.

To test the research hypothesis, the multiple linear regression model with panel data was used for the period from 2011 to 2016. The econometric model used in the estimation was as follows:

$$\mathrm{DIVULG}_{it} = \alpha + \beta_1 \, RENT_{it} + \beta_2 \, VM_{it} + \beta_3 \, ENDIV_{it} + \beta_4 \, ISE_{it} + \beta_5 \, GOV_{it} + \beta_6 \, TAM_{it} + \varepsilon \quad (1)$$

Where the dependent variable is the Disclosure of Environmental contingent provisions and liabilities (DIVULG), having Profitability (RENT) as independent variable and Size (TAM), Indebtedness (ENDIV), Market Value (VM), Governance (GOV) and the participation of companies in the Corporate Sustainability Index (ISE) as control variables.

4 PRESENTATION AND ANALYSIS OF RESULTS

This section shall address the search results. First, a descriptive analysis of the variables is presented aimed at observing their behaviors and the associations between them; subsequently, the regression model with unbalanced panel data is used to assess the research hypothesis and then it is analyzed if the profitability of firms with high polluting potential is positively related to the disclosure of environmental contingent provisions and liabilities.

4.1 Descriptive analysis of data

As seen in Table 4, some variables, such as RENT (35.5297), ENDIV (10.9375) and TAM (3.5149), presented a greater dispersion of the data around the mean, unlike the variables DIVULG (0.1460), GOV (0.4754) and ISE (0.4907), whose results show lower dispersion of data, as these are *dummy* variables. Variables TAM (21.0801) and VM (13.8523) has the highest means. The difference between the mean and the median of the variables RENT, VM, ENDIV and TAM evidence the asymmetric distribution of data.

Table 4
Descriptive statistics of data

Variable	Remarks	Mean	Standard deviation	Median	Minimum	Maximum
DIVULG	228	0.1348	0.1460	0.1538	0	0.5384
RENT	225	2.3857	35.5297	0.0387	-6.6172	532.428
VM	218	13.8523	2.7052	13.5150	7.4204	19.4907
ENDIV	226	3.3120	10.9375	1.8435	-32.6294	64.0001
ISE	228	0.6008	0.4907	1	0	1
GOV	228	0.6578	0.4754	1	0	1
TAM	225	21.0801	3.5149	21.2413	9.333	27.5258

Note. RENT: Return on assets; DIVULG: Disclosure of information on environmental contingency provisions and liabilities according to CPC 25; VM: Market Value; ENDIV: Indebtedness; ISE: Participation in the ISE; GOV: Adherence to one of the levels of Corporate Governance; TAM: Company Size.
Source: Research data (2017).

Considering the values of Table 5, the variable DIVULG is positively related with almost all variables hereunder, except for the Return on Investment, which presents negative correlation (-0.0611), but with low intensity. The market value (MV) was the explanatory variable that presented the highest correlation with DIVULG, recording 44.21%.

Table 5
Correlation between variables

	DIVULG	RENT	VM	ENDIV	ISE	GOV	TAM
DIVULG	1.0000						
RENT	-0.0611	1.0000					
VM	0.4421	-0.0307	1.0000				
ENDIV	0.0603	-0.0047	0.1972	1.0000			
ISE	0.3995	0.0566	0.5922	0.0878	1.0000		
GOV	0.2297	0.0435	0.5185	-0.0392	0.5639	1.0000	
TAM	0.3153	-0.0466	0.5290	0.0889	0.3247	0.2971	1.0000

Source: research data (2017).

Regarding the interaction of the other variables, the variable MV is strongly and positively related to ISE (0.5922), GOV (0.5185) and TAM (0.5290); likewise, ISE is related to GOV (0.5639), while the other variables are less closely related to one another.

4.2 Analysis of econometric results

After a brief descriptive analysis, the next step was the estimation of the econometric model. To that end, the tests of Chow and Hausman were performed to establish the most appropriate panel for the analysis of this research data.

Upon the Chow test (Prob> F = 0.0000) and the Hausman test (Prob> Chi2 = 0.0447), it was observed that there are evidences to reject the hypothesis that panel effects are not significant – that is, the effect of companies and the years is significant; and the fixed effects model is preferable to the random effects model. Therefore, it is reasonable to say that the fixed effects panel is more appropriate than the multiple linear regression for the relevant sample.

The tests of Wooldridge (Prob> F = 0.0185) and Wald (Prob> chi2 = 0.000) were also applied to verify, respectively, the self-correlation and heteroscedasticity. The results showed problems of autocorrelation and heteroscedasticity. The correction of these two problems was based on the Driscoll and Kraay (1998) test, which is grounded on the standard errors of the coefficients estimated by fixed effects, being these errors significant to the heteroscedasticity, temporal and spatial correlation (Missio, 2012).

The analysis of the results of the regression of fixed effects, highlighted in Table 6, indicate that, except for size (TAM), all other variables (RENT, VM, ENDIV and ISE) have statistical significance (10%, 5% 1% and 5%, respectively). It is further noted that GOV was omitted from the model, as it is a fixed dummy variable along the panel, therefore, its coefficients cannot be estimated in the regression with panel data.

Regarding the independent variable (RENT), it was found to have a negative coefficient (-8.51e-5) and statistical significance (p-value = 0.077); in this sense, it is possible to conclude that there is an indirect relation between Profitability (RENT) and the dependent variable (DIVULG), suggesting that most profitable companies disclose less information on environmental contingent provisions and liabilities.

Therefore, the hypothesis that profitability of companies with high pollution potential is positively related to the disclosure of environmental contingent provisions and liabilities was rejected. The results of the research are consistent with the findings by Silva et al. (2014), Murcia and Santos (2009) and Angonese et al. (2014), which show that profitability did not influence the disclosure of environmental information. On the other hand, researches by Rufino and Machado (2015) and Fonteles et al. (2012) identified a positive relationship between profitability and environmental disclosure.

Table 6
Regression results with fixed effects panel data

EXPLANATORY VARIABLES	COEFFICIENT	ERROR	T	P-VALUE
RENT	-8.51e-5*	4.68e-5	-1.82	0.077
VM	-0.0087**	0.0036	-2.41	0.021
ENDIV	0.0004***	8.89e-5	4.94	0.000
ISE	-0.0091**	0.0025	-3.63	0.001
GOV		(Omitted)		
TAM	0.0020	0.0015	1.29	0.207
Constant	0.2232	0.0332	6.72	0.000
Remarks:	215			
Within R-squared	0.0119			
F test:	0.0000			
Equation: DIVULG it = α+ β1 RENT + β2 VM it + β3 ENDIV it + β4 ISE it + β5 GOV it + β6 TAM it + ε				

Note. *p<0,10; **p<0,05; ***p<0,01; DIVULG: disclose of information on environmental contingent provisions and liabilities according to CPC 25; RENT: Return on assets; VM: Market Value; ENDIV: Indebtedness; ISE: Participation in the ISE; GOV: Adherence to one of the levels of Corporate Governance; TAM: Company Size.
Source: Research data (2017).

Variables VM (p-value = 0.021) and ISE (p-value = 0.001) followed the opposite direction of the variable RENT, since they obtained statistical significance and presented negative coefficients of -0.0087 and -0.0091, respectively, thus indicating that the higher the market value of the companies, and provided they are listed in the ISE, the lower the disclosure of contingent provisions and liabilities.

Regarding market value, this result corroborates the evidences verified by Sousa et al. (2014), which showed a possible conflict of interests, since the disclosure of information implies costs for companies, resulting in a reduction of gains for investors. This finding is different from Santos, Araújo and Leite (2016), who identified that companies that present information on environmental contingent provisions and liabilities perceive higher market value than those that do not disclose such information.

Regarding the variable ISE, the result deviate from the findings by Rufino and Monte (2014), which showed a positive relationship between sustainability and discretionary disclosure, suggesting that the variable ISE directly influences the disclosure of information. This result also opposed the study by Garcia and Orsato (2013), where no significant statistical differences between the decision of a company to adhere to the ISE and the impact on the value of the company's shares.

Regarding indebtedness (ENDIV), a positive (0.0004) and significant (p-value = 0.0000) relation was observed with the variable DIVULG, evidencing that more indebted companies have a higher level of disclosure of environmental contingent provisions and liabilities. This result deviates from the findings by Rufino and Monte (2014), which concluded that the greater the indebtness the lower is the discretionary disclosure of information in the entities. It also contradicted the findings by Murcia and Santos (2009), which proved the variable ENDIV was insignificant in determining the discretionary disclosure.

Finally, when analyzing the variable TAM, it was observed that there was no statistical significance, that is, the size of companies is not related to the disclosure of contingent provisions and liabilities; result similar to that found by Santos, Lucena and Duarte (2015), but contrary to the findings by Murcia and Santos (2009), Rufino and Monte (2014), which showed that company size is a determining factor of discretionary disclosure.

5 CONCLUSIONS

This objective of this study was to analyze whether the profitability of the companies with high polluting impact listed on B3 is positively related to the disclosure of provisions and environmental contingent liabilities, between the years 2011 to 2016. The research sample comprised 38 companies falling within the group of companies with high polluting potential, determined in accordance with Attachment VIII of Law 10.165/2000, which provides for the National Environmental Policy.

Data analyzed in this research were collected in the database of Economática® and organized in an unbalanced panel, as it was not possible to obtain all the data for all companies with high polluting potential. From the regression model with robust panel data, it was found that , except for size (TAM), all variables (RENT, VM, ENDIV and ISE) are statistically significant (10%, 5% 1% and 5%, respectively); that is, they can explain the disclosure of environmental contingent provisions and liabilities. The variable GOV was omitted from the model, since it is a fixed dummy variable along the panel.

Regarding the hypothesis (**H_1**: The profitability of companies with high polluting potential is positively related to the disclosure of environmental contingent provisions and liabilities), a rejection was observed, because, despite the significance, a negative coefficient was obtained, showing that the most profitable companies are not necessarily those that most disclose information about environmental contingent provisions and liabilities.

A possible explanation for the result found is that the implementation of a legal requirement for the disclosure of environmental contingent provisions and liabilities leads to higher cost, which, in turn, is reflected in the performance of the company, given the possible of conflicts of interest and expectations of a reduction of gains by shareholders/investors. On the other hand, this result can be explained by the fact that the most profitable companies already stands above their competitors in the capital market, with positive financial indicators and, therefore, they do not disclose "all" information if they perceive that it may jeopardize their results.

In this sense, the results hereof indicate the need to deeper discuss the regulation of the disclosure of environmental contingent provisions and liabilities, considering that companies tend to disclose more data under the watch of a regulatory agent. Moreover, it is extremely important to standardize the disclosure of such information, especially in the decision-making process of investors and other interested parties of companies with high polluting potential.

It is further highlighted that this result may have been influenced by some limitations throughout the study, such as the subjectivity of the content analysis to determine the variable DIVULG, and the fact that the analysis did not cover the sector in which each company operates.

Future researches may analyze these limitations, as well as the use of other variables and metrics to expand the study and the use of other classification levels, such as companies with small and medium environmental impact, according to the provisions of Attachment VIII of Law no. 10.165/2000.

This research contributes to the literature by revealing if there is a positive relationship between the profitability of the companies with high polluting impact listed on B3, and the disclosure of environmental contingent provisions and liabilities. Although some research - such as Rufino and Machado (2015) and Fonteles et al. (2012), which addresses the determining factors of discretionary disclosure - consider that the most profitable companies tend to disclose more information, the results found in this study showed that this does not occur when the disclosure encompasses environmental contingent provisions and liabilities.

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1 Articles and works to be published are evaluated by at least two Ad hoc consultants, through the blind review system, being also submitted, through the same system, to the Scientific Editor, and / or by members of the Editorial Board. In this sense, the double blind review system is ensured, and the authors of the papers are not known at any evaluation phase.

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- **Abstract:** An informative summary of up to 250 words should consist of a single paragraph.
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- **Format:** Do not exceed 15 pages (minimum of 8), including References, typed in software compatible with Microsoft Office 2000 or later versions for Windows, with the following specifications:
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  Table 1
  Data Distribution Normality Test

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